THE STANDARD SPECIAL ENGINE

By John Merton (04/2008, revised 03/2016)

Introduction.

In 1937, Leonard P Lee, head of Coventry Climax Engines Ltd, and son of that company's founder, took a decision which was to lead directly to the adoption of the Standard Special engine by the Morgan Motor Company.

Coventry Climax were a long-standing manufacturer and supplier of engines to the car and commercial vehicle industry, and built and supplied the 1122cc inlet-over-exhaust engine which had powered most production Morgan 4/4's since that car's introduction in late 1935. However, the car trade had become increasingly problematical for Coventry Climax. Several of its smaller customers, including Swift (1931) and Vale and Marendaz (1936) had gone out of business, and Crossley ceased car production in 1937. Triumph, which had made its own 4 and 6 cylinder engines to Coventry Climax designs under a licensing arrangement, ceased this when it completed the move to its own in-house designs from 1936. Faced with the vagaries of the car trade, Lee decided, in 1937, to cease the manufacture of engines for the car trade concentrating instead on a government contract for the manufacture and supply of fire pump trailers, using two existing engine designs, the smaller the side-valve unit from the defunct Swift.

Faced with the fact that its existing contract with Coventry Climax would not be renewed, Morgan was forced to look for another engine supplier. The Standard Special engine was the result.

Incidentally, there is no truth whatever in the claims that surface from time to time that Triumph rather than Coventry Climax itself supplied the Coventry Climax engines to Morgan. Indeed there are a number of structural and design differences between the Triumph-made engines and the in-house Coventry Climax ones as supplied to Morgan, and Triumph did not build or use the so-called "improved" version of the engine which Morgan adopted from July 1936.

Nor is there any substance to the parallel stories that Triumph either owned or had some management control of Coventry Climax in the pre-war period.

Design Features

The Standard Special engine is a reasonably conventional in-line 4 cylinder engine of 1267cc, with a bore of 63.5mm and a stroke of 100mm. The bores/crankshaft are de saxe, the offset necessitating a small cut-out at the right-hand bottom of each bore to allow clearance for the connecting rods.

One and two, and three and four cylinders are siamised (more later). The crankshaft runs in three main bearings, and both these and the big end bearings are the shell type. The thrust is taken by washers on each side of the rear main bearing. The big ends of the connecting rods will not pass down through the bore and the pistons have to be inserted from underneath. There is a lead at the bottom of each bore to assist this. There are alloy sealing blocks covering the two end main bearing caps to ensure a flat surface for the sump to bolt onto. There is a small vertical slot at each end of these sealing blocks where they bear on the sides of the block for the fitment of fibre filling pieces to help prevent oil seepage at these junctions. The sealing blocks are attached to the engine block with two 5/16" BSF set screws. The bolts attaching the sump to the block at these sealing blocks are generally the coarser Whitworth thread rather than the BSF thread used for the other sump attachment bolts. However some engines do have BSF bolts used here and it is important to check when reassembling. The threads into the alloy sealing blocks are all too easy to strip if they are over-tightened. The lowest attachment bolt for the timing case also screws into the front sealing block and similar care is needed, likewise the two bolts into the rear oil container.

The camshaft is on the left side of the motor and generally runs direct in the block (the author has seen one engine with one piece shell bearings, almost certainly original). There are four journals that bear on the block, these are 1 11/16", 1 15/32", 1 7/16", and 1 13/32" going from front to rear. The camshaft journals on the engine with the inserted bearings were slightly undersize on these measurements. Supposedly the camshaft was ground to a greater degree of overlap than those in either the Flying 8 or 10hp side-valve engines, but on measurement I have found no discernable difference between the

Morgan camshaft and that from an 8hp engine. There is a single row timing chain, and a spring steel tensioner blade which is attached to the inside of the timing cover, not to the block. Timing gear alignment is via shims under the timing gear on the crankshaft. Distributor drive is via a vertical shaft from a cogwheel at the centre of the camshaft, this shaft continuing downward to activate the oil pump. Camshaft location and end float is via a steel plate (the camshaft locating plate) at the front which has a half moon cutout, and is fastened to the block with two bolts.

The pistons can be of either the three or four ring variety, although most replacements these days seem to be the latter. The top ring has a tendency to break on the former. The pistons and connecting rods are as for the Standard 10hp engine. The connecting rods from the 8hp engine are similar, but have a smaller gudgeon pin diameter.

There is a steel plate bolted to the front of the engine which incorporates the feet for the engine mounts. At the rear there is another steel plate, or engine cover, which provides the mounting base for the bell housing, and also the starter motor, which is at the bottom right hand rear of the engine block. The starter motor has month and year of manufacture stamped on it.

There is an alloy rocker cover, incorporating a raised “Morgan” on the top in running script.

The generator is attached to two brackets off the top left of the engine block, and will also have month and year of manufacture stamped on it. The three 5/16” BSF attachment studs for the front mounting bracket incorporate a spacer so this bracket stands a fraction over half an inch proud of the front of the block. The rear mounting bracket bolts direct to the block and straddles the tappet cover plate.

An AC mechanical petrol pump drives off the rear of the camshaft. The rear bolt on this is difficult to access and one approach is to use a longer bolt with a nut welded ¾” or so up the thread. There is a quarter inch thick spacer between the pump and the block. The thickness of this needs careful checking on fitting and may require some adjustment to ensure the foot of the pump maintains enough contact with the cam lobe to keep operating.

The four spark plugs screw horizontally into the cylinder head on the right hand side of the motor. They are underneath the inlet and exhaust ports, and numbers one and four angle outwards slightly.

Lubrication. The Standard Special engine uses the oil pump from the Standard 12/14hp engines which has a higher capacity than that from the 8/10hp engines. It is a compact canister design with a fixed gauze filter, and draws oil from the lower part of the sump. It does not have the pump with a floating filter and pick-up ascribed to it in some Morgan literature, this error apparently arising from an article in “The Light Car” May 26 1939. This type of pump, which was used in the 8/10hp engines, cannot be fitted to the Standard Special engine because of the nature of the sump baffling.

The sump is unique to the Standard Special engine.

It is probable that this incorrect information was provided in a hand-out from the Morgan company, on the assumption the pump was the same as in the 8/10hp engines. It is unlikely that those providing the information would have had the opportunity to inspect the internals at that time.

The error also appears in the Dowdeswell manual, which was incorporated into the Morgan Autobook One manual, although both, in then talking of the need to take care not to remove the gauze surrounding the oil pump, fail to pick up the error.

The oil pump transmits oil to a horizontal gallery on the left hand side of the block, which feeds the crankshaft, the camshaft and the tappets. The tappets (cam followers) are held in place by two blocks, each fastened to the engine block by two bolts tapped right through into the bores themselves. It is of course critical in reassembly to ensure these bolts do not intrude into the bores. There is a small horizontal channel behind each block for oil transmission. A piece of copper wire suitably “half-mooned” where the oil holes go through to the tappets sits in these grooves to control flow, and there is a thin paper gasket between these assemblies and the engine block.

There is also, or should be, a short casting attached between the two inner bolts holding on the tappet blocks with a semi-circular cut-out in its middle which acts as a collar on the distributor driveshaft to stop

the drive gear jumping out of mesh with the camshaft gear. On some engines this may be found to be missing or lost, thus allowing the gear to ride up and jump out of mesh, for example if the engine backfires. This can be remedied with a snug fitting thinwall brass tube over the driveshaft to bridge the distance between the drive gear and the distributor's drive sleeve. Otherwise a new bracket with collar can be made up.

A side-mounted tappet cover plate with rounded edges covers this area of the engine. It is held on by two domed brass bolts attached to two screw-in studs, this set-up also securing the two engine breather pipes. This cover plate has a crescent of five small holes drilled under each retaining stud hole. Using suitably shaped gaskets(usually cork) the plate is mounted with these holes facing the bottom, as they have the dual function of breather and allowing any oil carried with the blowby gases to flow back to the sump.

The horizontal oil gallery has take-offs for a pipe to the rear of the cylinder head to lubricate the rocker gear, another take-off for the oil pressure gauge and yet another for the feed to a by-pass oil filter. Each end of the gallery is sealed by a half inch in diameter aluminium plug which is screwed in then cut off flush. The return from the by-pass filter is direct to the sump. These oil filter pipes were originally bundy. There has been a tendency to replace these pipes with copper ones, a huge mistake as they will work harden and that to the sump in particular will fracture just where it enters the sump. Not a case of if but when and I have heard of several engines being ruined because of this. The fittings are common BSP ones and it is best to have an hydraulic hose specialist make up new flexible pipes.

There is a ball and spring type oil pressure relief valve except on early pre-war engines which had a plunger instead of the ball. This reflected contemporary practice in the small Flying Standard side-valve engines.

Oil return at the ends of the crankshaft is by scroll thread arrangements. At the front the thread is machined onto the alloy fan pulley, assisted by a dished thrower just inside the timing case. At the rear, both the crankshaft and the one piece alloy covering plate (the rear oil retainer) have scrolls machined on them. It is critical that both the rear oil retainer and the front pulley be centred correctly on reassembling one of these engines, otherwise some awfully alarming noises may result and also the thread on the pulley and rear oil retainer plate ground off!

The front crankshaft pulley nut is ¾" BSF thread. It is sometimes difficult to feed this over the end of the crankshaft until it engages the full thread. There is a locking tab washer underneath it with three tabs to lock the nut and another smaller tab on the inside which engages in the Woodruff key slot in the pulley itself.

Lubrication of the bores and gudgeons, particularly on start-up, is assisted by a small hole (called a squirt hole) drilled through the big end of each connecting rod, offset to the right hand side. Although superficially the connecting rods look identical, they are in fact matched pairs, the more pronounced big end flange on No 1 connecting rod facing that on No 2 and similarly for 3 and 4. Likewise, the big end bearing shells do not have the centre oil hole common to most these days but two holes offset either side of centre. Some replacements, for example the big end shells from the Austin A40, which only have the centre hole, made need a suitable offset hole to be drilled in each top shell matching up with the squirt hole.

As mentioned earlier, the alloy sump is unique to the Standard Special engine. It has heavy internal baffling, and there is a flat horizontal steel plate bolted to the top of these baffles to help control oil surge. This plate has a cut-out at left centre to allow for the oil pump and another smaller one opposite this for the dipstick.

Valve gear lubrication is via the pipe from the rear of the oil gallery to the left rear of the cylinder head, up through the rear rocker support pillar into the centre of the rocker shaft and hence to each rocker. The bushes in the rockers are two-piece, straddling and forming a central channel which conveys oil down a shaft drilled down the rocker to the pads bearing on the valve stems. These shafts have a felt wick or a piece of twisted wire in them to control oil feed, and would almost certainly have clogged up over time and need to be cleaned out.

The pushrods are hollow and, once again, may have clogged up over time. At their lower ends they are fitted with a spring , held on with a horseshoe collet, to assist in return. Although some references claim there is a 0.015" clearance where the tappets bear on the bottom of the camshaft lobes, this is incorrect, as the spring loading ensures they are in constant contact. The actual specified valve clearance, measured between the rocker and the valve stem, is 0.022", quite wide for the period. There has been a tendency to want to decrease this clearance but this is fraught – simply put, the machining of these engines is so poor that in a number of cases this has led to the springs binding with resultant rocker breakage.

The valve heads were originally cut to a 30 degree angle. Nowadays most seem to have been recut to 45 degrees.

Manifolding. There is a one-piece cast iron manifold for both inlet and exhaust. It has a hotspot. The exhaust section runs over the top of the inlet, towards the front of the car, whence it curves downward and joins a pipe which exits through a hole in the vertical chassis rail. The manifold is on the right hand side of the engine, the opposite to its side -valve Flying Standard contemporaries. The inlet ports in the cylinder head are siamised, with one inlet hole each for one and two, and three and four cylinders respectively. There is a separate port for each of the exhausts.

Carburetion. A single Solex downdraft model 30 FAI was used.

Cooling. Water cooling on all engines was by the thermosyphon principle, assisted by a two blade fan. The triangular boss and shaft on which this fan and its associated pulley are mounted is bolted (with three 5/16" BSF bolts) to the right hand front of the block and covers a ¾" diameter access hole to the water jacket. These bolts will work loose over time, leading to coolant loss, and should be checked periodically for tightness, say at 5,000 mile intervals.

Despite the claims in multitudinous books and articles, these engines were never fitted with a water pump. This error appears to have originated in an "Autocar" article of July 5 1946 which incorrectly referred to a "water impeller unit".

Timing. The engine is designed to fire at top dead centre at rest. There is a timing arrow on the flywheel and another at the top of the rear engine cover plate. The latter is hidden with the bell housing in place, so with the engine in the car it may be easier to centre the timing arrow on the flywheel in the bottom hole in the bell housing and time off No 2 cylinder. It is recommended that final timing be done by road testing, advancing the spark until the engine just starts to ping then backing off slightly.

The distributor is of a type common to many British light cars of the time. A slotted sleeve is pinned to its shaft, this engaging with the end of the vertical driveshaft from the camshaft. This can have a tendency to ride up and wear the base of the distributor over time, causing the rotor to grind into the distributor cap. The only spark provided is by bobweights – vacuum advance and retard was not fitted. For hawkeye originality freaks, the flat side of the distributor body will have month and year of manufacture stamped on it (eg 2 49). An arrow will point to this. The spark plug leads are routed through two locating brackets, one mounted as a horizontal rearward extension just below the distributor (attached via the bolt that also holds the coil bracket at its rear attachment point) the other as a vertical extension off one of the bellhousing attachment bolts at the rear right hand side of the engine. There are rectangular caged sections at the end of each of these brackets to carry the spark plug leads, and the leads are shielded further from contact with the sides of these cages by a rubber moulding.

There is a brass water cock on the rear lower right of the block. The engine number (starting with "Q" and ending in "E" and usually with one, two or three numbers) is stamped on a raised boss about halfway along the right of the block towards the top.

Design Antecedents.

The Morgan Company claimed that the Standard Special engine was based on the earlier Standard 9 side-valve unit which preceded the "Flying" range of engines. Given that engine's stroke of 100mm, this is more feasible than tracing its origins to the earlier 10hp engine, which had a stroke of 106mm. Various other claims have it as an OHV version of the Flying Standard 10 engine, or even an overhead valve conversion of that engine.

None of these claims is strictly correct. The cylinder block casting is unique, and is narrower than that used in either the 8 or 10hp side valve engine. . There are 10 head studs, in two rows of five, unlike the side valve engines which had three rows of studs. The cylinder head and sump castings are likewise unique. It uses the crankshaft from the 8hp engine, the rods and pistons from the 10hp engine, and the oil pump from the 12/14hp engine. Siamisation of the bores means the centre spacings are closer than those of the side valve 10hp engine which had full water jacketing, hence the need to use the 8hp crankshaft. The spigot bushing is also iolite, as in the 8hp engine rather than using the roller bearing from the 10hp crank. The 1ohp crankshaft can be fited but the two centre connecting rods will require modification. Note that the flywheels for the 8hp and 10hp side valve engines are the same , except the clutch pressure and driven plates in the 8hp engine are smaller hence their attachment holes are at a smaller diameter.

In terms of design timing, Laban claims that this engine was first offered to Morgan in 1937. If so, its development would have paralleled the development by Standard of its new range of side valve engines for its "Flying" range of cars (Laban, Brian:"Morgan, First and Last of the Real Sports Cars", Virgin Publishing Ltd, 2000). The offer also appears to coincide with Coventry Climax's decision to exit the car engine trade. Why Standard decided to develop this engine is unclear, although they were producing OHV engines in larger sizes, and to different design parameters, for SS Jaguar. Incidentally, although Weslake has a claimed involvement in the development of the OHV (crossflow) cylinder heads for the SS Jaguar engines, its seems unlikely he was so involved with the Standard Special engine.

As far as I can determine, the engine was never used in any production vehicle other than the Morgan 4/4. However, apparently it was used in the first Triumph Mayflower prototype after the War.

Pricing and Quality issues.

According to Laban's research, the price of the Standard Special engine in November 1937 was around **£**25 compared with Climax engines which had risen to **£3**6 from **£2**9. When compared further, HRG were paying **£34** for the Meadows 4ED engine in 1935 (Dussek, Ian,: "H.R.G: The Sportsman's Ideal" MRP. 1985).

> This makes the Standard Special engine seem a comparative bargain (more so when contemporary reports indicate it was available as an option for an extra 5 pounds!), but "there is no such thing as a free lunch".
>
> While it is quite a strong little engine (main bearing journals of 2" in diameter compared to the 1.75" in the Austin A40, for example; both having 1.75" big end dimensions) it is a shoddy piece of work. The block, head and manifold castings in particular are rough examples indeed of foundry work.. Expect to find left over casting ridges and dags in the porting and jacketing and left over bits of core wire in the water jackets. The cylinder head casting is so sough that I doubt Weslake would have wished any association with it. We have found considerable weight variations between connecting rods, and some crankshafts have been well-nigh impossible to balance without the removal of almost alarming amounts of metal from the webs. In the case of the connecting rods, balance has finally been achieved several times by juggling big-end bolts and nuts with those from the Armstrong Siddeley 16/18hp engines which are waisted and a better design, weighing about 8 grams less than the Morgan ones. The starter ring gear is cut into the circumference of the flywheel. The two centre studs on the water exit manifold are drilled through into the two centre exhaust ports. All of the head studs are tapped through into the water jacketing. The problem with rocker breakage when valve clearances are closed up tighter than the specified 0.022" appears to be due as much to the shoddy finishing of the head as anything else. The single row timing chain and camshaft running direct in the block were mentioned earlier.
>
> Mind you, some of these comments apply also to the small Standard engines!
>
> So HFS Morgan may have been a shrewd businessman but so was John Black, the head of Standards!
>
> **Specifications.**

Capacity: 1267cc, bore 63.5mm stroke 100mm.

Power (contemporary quotes): Pre-war 38.8bhp @ 4,500rpm compression 6.8 to 1, post-war 40bhp @ 4.300rpm compression 7.0 to 1.

Torque (quoted post-war): 61.6 lb ft @ 2,500rpm.

Firing Order: 1-3-4-2 from 1 at rear of engine.

Spark Plugs: Champion N8.

POINTS: L10/GL10.

£