Hawke, M. F. (1992): K3 Dossier: A History of MG's Most Famous Racing Cars, Triple-M Register, pages 6-14.

To design and build a racing car to compete in international events is a task of enormous proportions. To have a prototype running in less than 20 weeks is incredible. To win a major event and take the team prize first time out, less than six months after starting work is in the realm of fantasy.

Under the leadership of H. N. Charles, their chief designer, the MG team of technicians, draughtsmen, engineers and mechanics achieved exactly this in producing the K3.

The concept was brilliant and completely opposite to the continental approach. It was to build a small capacity car like a big car. The philosophy appears to have been not to be afraid of weight, but make it strong and reliable. Save weight where possible but not sacrifice strength. Then develop the engine to provide enough power to outpace the opposition.

It is interesting to compare the K3 to its main rival - the 4CS 1100 Maserati. The basic statistics reveal the differences in the way the respective designers approached the problems.

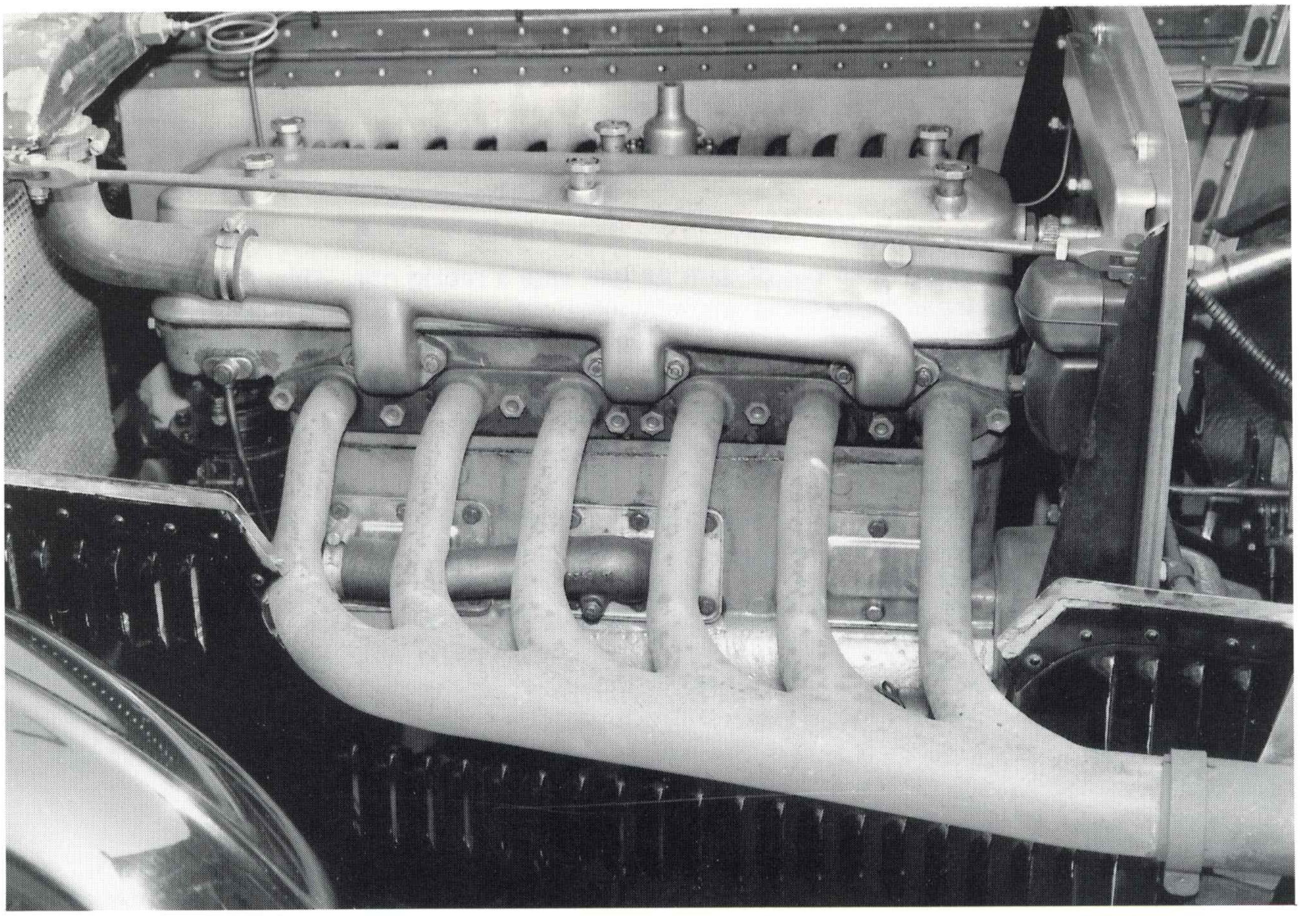
1100cc Mille Miglia Cars 1933

	MG	Maserati
Wheelbase	7ft 10ins	9ft 0ins
Track	4ft 0ins	4ft 0ins
Weight	1980lbs	1540lbs
BHP	120 @ 6,500	90 @ 5,300
Engine Cap.	1,100cc supercharged	1,100cc supercharged

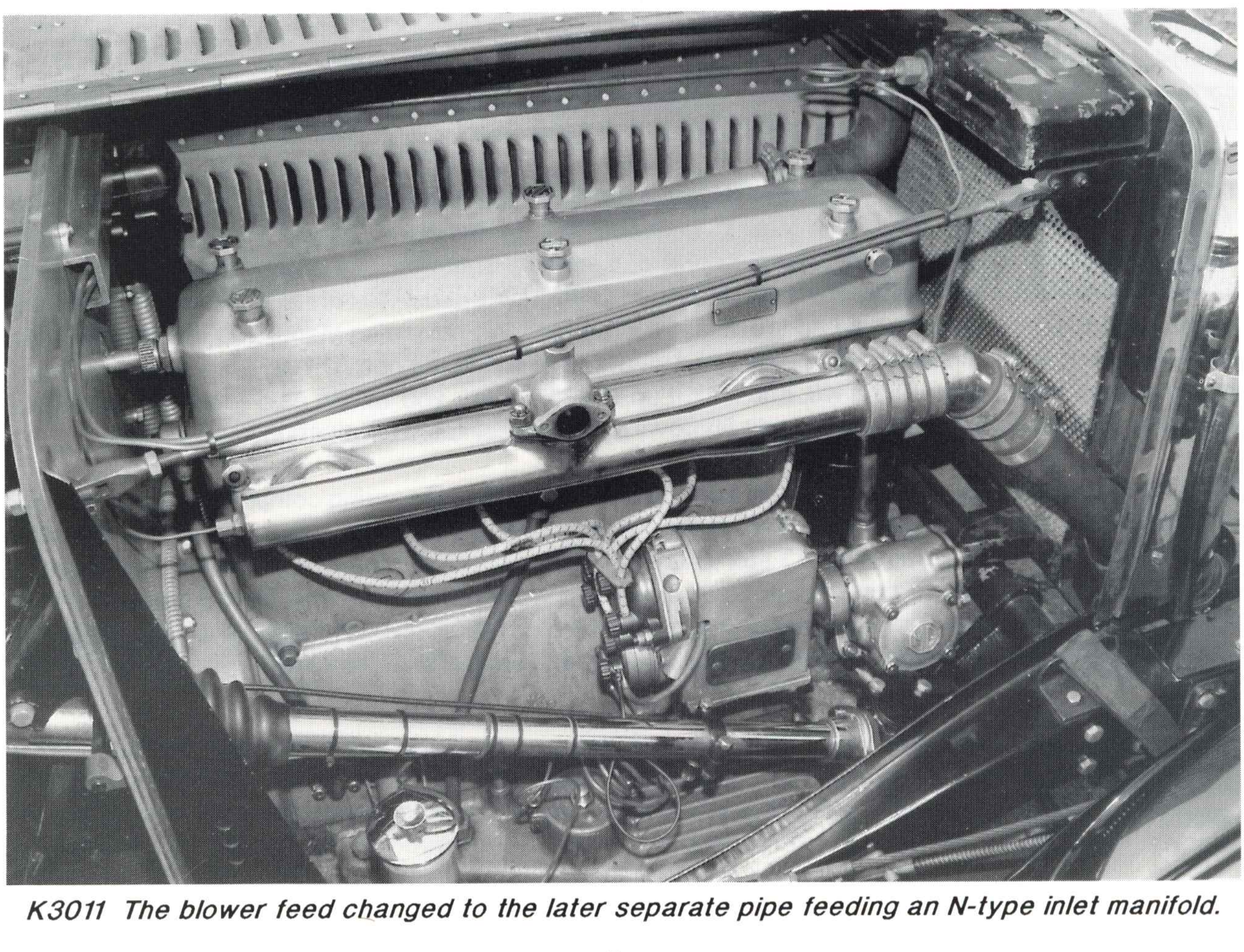
What then made the K3 a winner? If the old adage of "what looks right probably is right" then that should have been enough. In both its Mille Miglia form with the slab tank body and the pointed tail configuration it has to be one of the finest looking cars ever built. Which version you prefer is a matter of taste.

The K3, as has been said, is a sturdy car, it has a strong, supple chassis which ensures that it keeps its feet firmly on the ground. It has an engine which is sometimes too willing for its own good and produces lots of big horses from 3000 rpm onward. The preselector gearbox is quite delightful and makes it a very easy car to drive. (The K3 was almost certainly the first racing car to use a preselector as part of its original specification). It has superb brakes. The balance of the car tends to be marginally nose heavy, and the steering lacks a little precision, though the stability of the chassis overcomes these minor shortcomings.

The chassis of the K3 followed closely the design of that of the K1 Tourer and saloon. They are unique in the OHC range in that for much of their length there is a second channel inside the main chassis side rail. This was a clever way of adding beam strength without increasing the torsional stiffness. The torsional flexibility is one of the major elements in the car's impeccable handling at higher speeds. The tendency of the small car chassis (the C, J, P etc.) to racking, i.e. the longitudinal movement of one side relative to the other, had obviously been noted. This was eliminated on the K chassis by bringing the inner stiffening channels together to form a wide based X in the centre bay behind the gearbox. The use of open channel sections back to back ensured that it retained the suppleness which would have been spoilt had a box section been used. The addition of a tube between the front hangers of the front springs not only tied them together properly it also provided something on which to bolt the blower.



K3011 The exhaust side of the engine showing the efficient manifold arrangement.



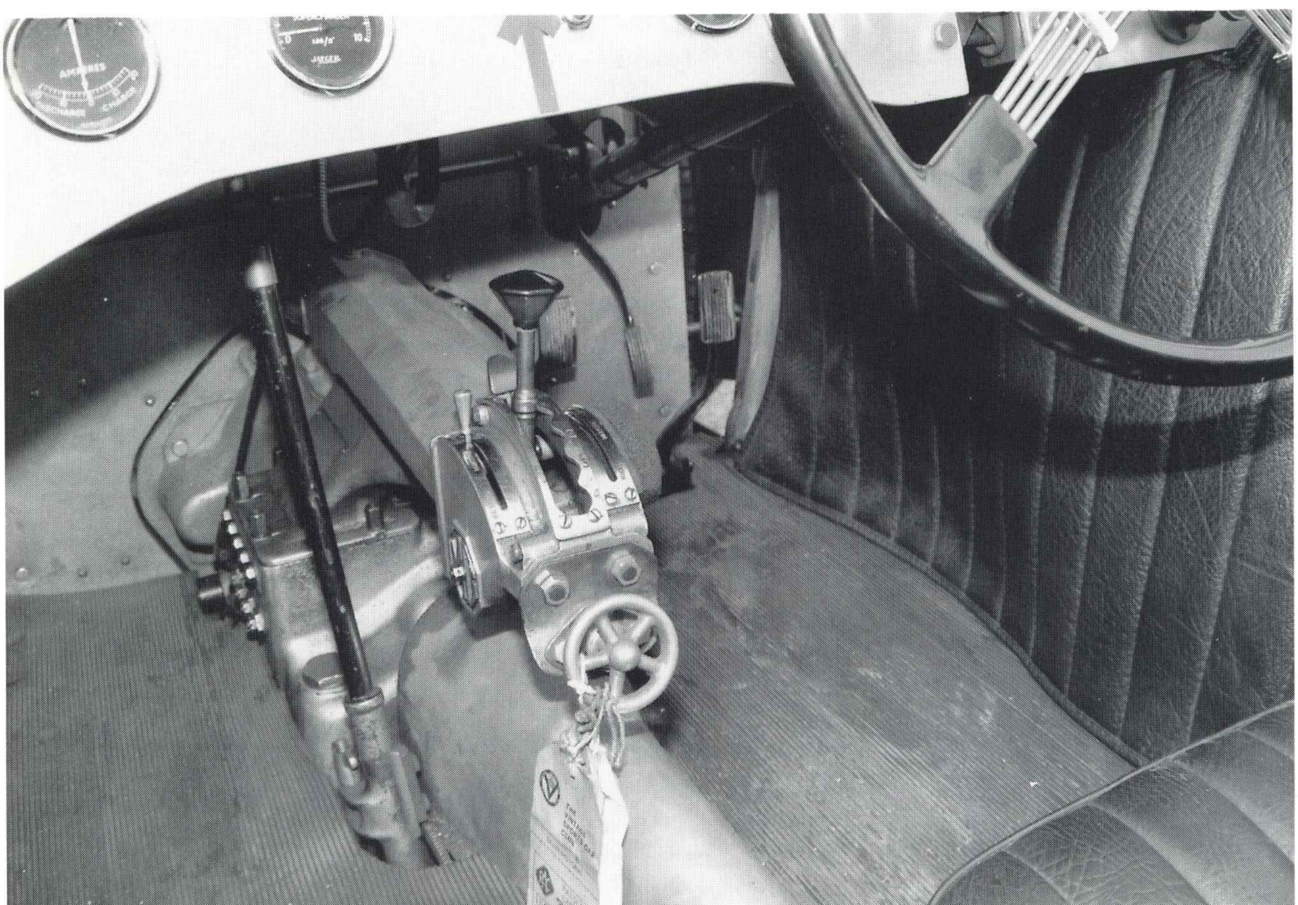
K3011 The blower feed changed to the later separate pipe feeding an N-type inlet manifold.

The method of attaching the springs to the chassis followed that pioneered on the C-type and which was subsequently adopted for the whole OHC series. The front end of the front springs have eyes pinned in cast malleable iron shoes rivetted and bolted to the frame. At the rear of the spring the main leaves are ground to a bearing surface and slide in bronze bushes which in turn are carried in cast boxes fixed to the underside of the frame. The bushes are shimmed laterally to provide accurate sideways location. At the rear a similar system is adopted, the eyed front end of the spring fits on a pin screwed into an extension of a chassis crosstube. While the rear of the main leaf again slides in bronze bushes which are this time housed inside the extended rear crosstube. Both front and rear springs are slightly cambered in the normal condition ensuring that the worst effects of roll steer are eliminated, even though the very stiff springs used, especially at the front, ensured that very little roll is ever experienced.

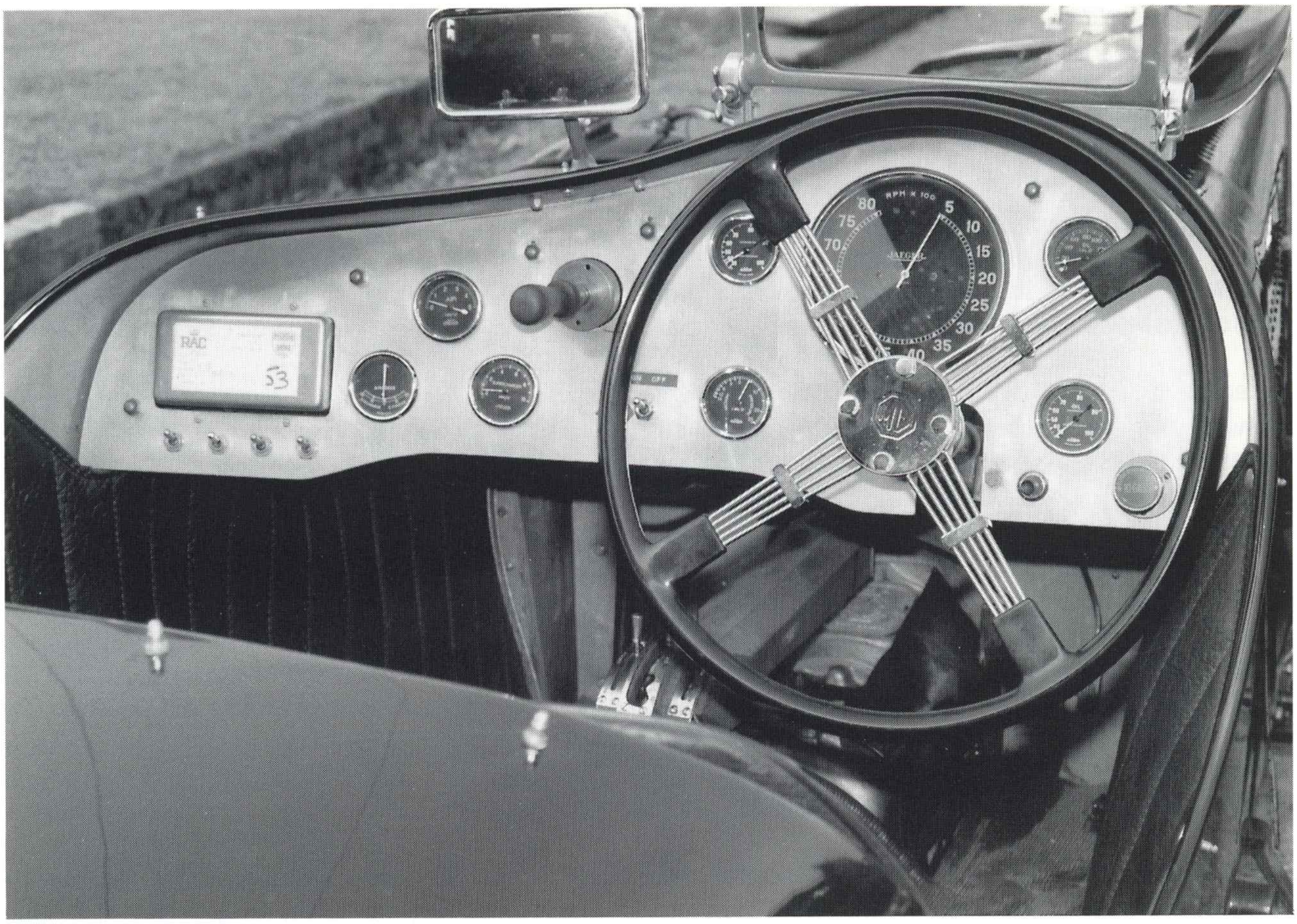
The care taken in the design of the suspension results in excellent axle location eliminating the need for a torque tube at the rear thus saving considerable weight. The wisdom of absorbing all the drive torque in the rear springs is often questioned but axle tramp is unknown even on cars with almost double the original horsepower.

The front axle, being bolted directly to the springs, is also very precisely located. The divided track rod system which was evolved for the J4 was standardised on the K series. Together they make the car very controlable with good directional stability at speeds up to 130mph on today's smooth roads. We can only guess at how it felt on the surfaces encountered during the Mille Miglia in 1933, although contemporary reports are full of praise.

The divided track rod system is something of a curiosity. The reasons for its adoption originally were stated as an attempt to reduce the effects of the angular swing of the drag link relative to the vertical movement of the axle which would produce a deviation of line over bumps. The method adopted was to locate an idler arm on a pivot on the axle positioned between the springs. On the assumption that a



K3011 the pre-selector gearbox and remote control.



K3011 the businesslike cockpit of this car is one place we would all like to try for size!

road bump only affected one wheel at a time the relative movement of the axle at this point would be at a minimum. The wheels are connected to this arm by track rods whose position relative to the axle remains constant. The shorter drag link which results from this system, however, has a much greater angular movement over a shorter radius with a consequently greater effect, even allowing for the minimised axle movement the system appears of questionable value. Suffice to say it did no harm. One definite benefit I suspect was that by introducing another two spring loaded joints into the system some kickback was eliminated, the cars excellent geometry was less constrained and got on with the job by itself very well.

The insistance of the MG Car Company to persist with worm and peg steering boxes on the later OHC cars has always been a puzzle. The M, C, D and F all were fitted with proper worm and wheel steering, with proper adjustment and given good lubrication they never wear out. At the end of 1932 along came the J with the awful Marles Weller box. A worm and peg arrangement of the worst type. The fundamental design of this type of mechanism is flawed, in that a peg moving in an arc across the axis of a worm can only be in correct mesh at a maximum of two instantaneous points. The rest of the time it is incorrect ! This fact allied to the mechanical deficiencies of the Marles version of this system make it one of the worst. Not withstanding this the 1933 K3 appeared with it. However, its shortcomings must have become apparent quite quickly because the 1934 cars were fitted with Bishop Cam boxes. These were a better engineered job, but still used the same principle. Why these were fitted to a racing car with international aspirations and on which so much care and expense was lavished in other ways is inexplicable, particularly when there were several good proprietory 'proper' steering gearboxes available.

The tale of M. Bugatti expressing the opinion that the front axle was too frail in prototype form is well known. The heavier pattern made to replace it on the K3 became standard on the KN and on some K2s. Even this has also been known to shear just behind the king pin eye as a result of brake torque, the effects of which are magnified by the torque stays fitted to prevent the castor angle changing when the brakes are applied.

The brakes designed for the K-types followed the layout previously proven on the smaller racing cars. This comprised a cross shaft with pullies on each end which operated separate Bowden type cables to each corner of the car. The outer cable bolted to the chassis and anchored on the backplate to give the maximum rigidity against which the inner would operate. The backplates for the K were made as castings in electron, much lighter and very much stiffer than the pressed steel plates on the smaller cars. The 1933 cars had a single camshaft with a figure 8 shaped cam. The ends of the 13inch elecktron shoes carried a roller against which the cam operated. The other ends of the shoes pivoted on sturdy steel pins rigidly fixed in the backplate.

A careful study of this layout reveals a problem which plagued all the OHC cars. Nowhere in the system is there any compensation for uneven cable stretch, uneven wear, varying lining thickness, shoe eccentricity, or any of the other dozen problems which cause a brake not to perform at its best. As a result of this it is a very difficult and time consuming job to build and set up these brakes to give of their best and the rapid replacement of worn shoes is impossible.

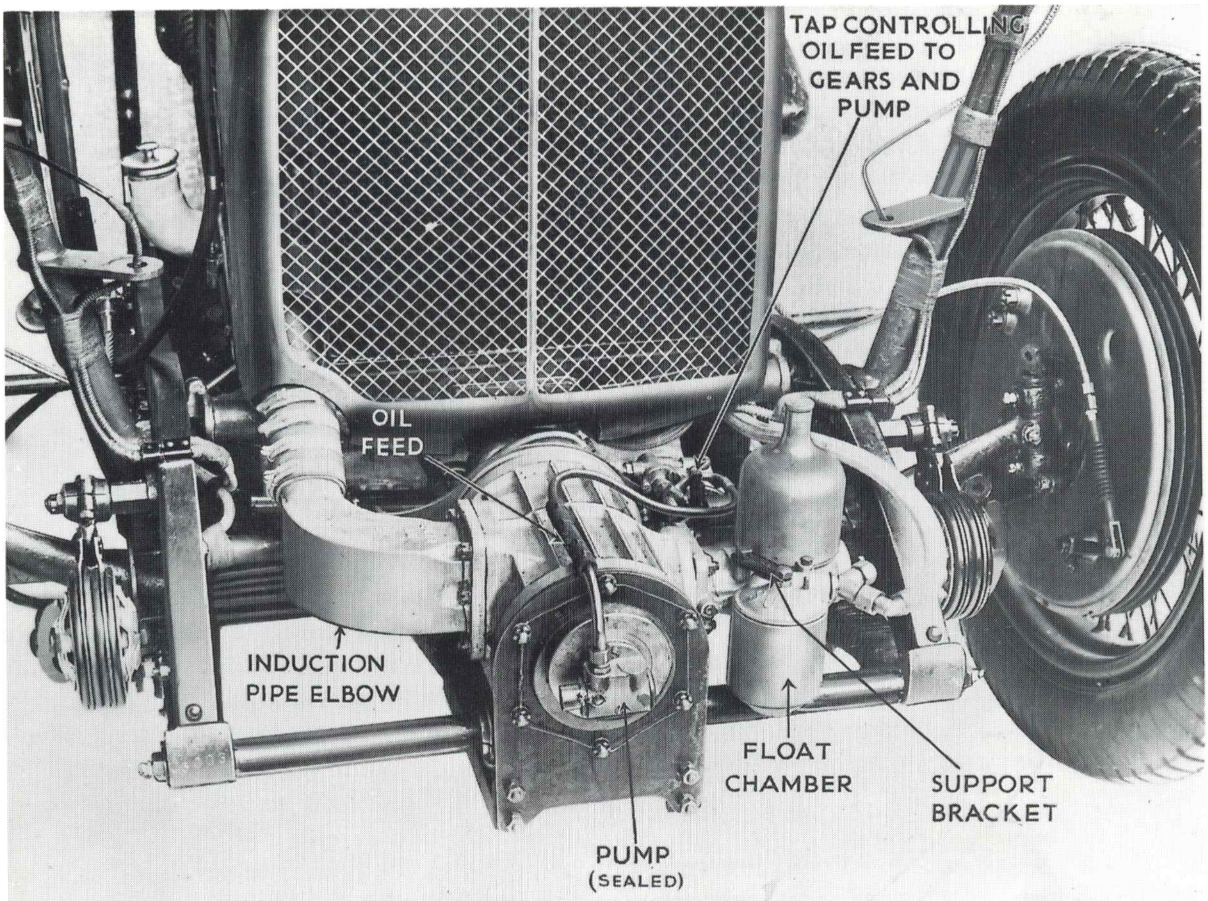
By 1934 the design team had revised the complete backplate assembly. The new system was like all good ideas, quite simple. The single camshaft was replaced by two separate ones with separate levers operating back to back against each other, one lever operated by the pull of the inner cable, the other operated by the push of the outer one and each obviously operating one shoe independently. The lower ends of each shoe finished in a common wedge adjuster with a compensating slider. These brakes were excellent in operation and much easier to maintain. They were MG's final essay in mechanical operation - hydraulic brakes being used on the R-type.

The drums for the K3 were unique and worthy of particular note. They were splendid electron castings but made entirely differently to the identical looking ones on the production K1 and K2 cars. The production drums were made by casting the electron around a ferrous metal liner. This process initiated the rapid formation of an oxide layer between the two metals which had two results, one being that the oxide formed a superb heat barrier, preventing proper cooling leading to distortion and brake fade, in addition as the oxide expanded it cracked the electron dums. Both of these problems manifested themselves on the very early cars leading to the manufacture of the K3 drum which is a real toolroom production. The electron casting is bored and a top hat sectioned, spun iron liner is turned to a heavy interference fit. The drum is heated and expands, the liner is dropped in where the shrink fit retains it. Just to make sure the flange is then drilled and countersunk screws passed through it into the first rib on the drum. K3 drums do not give problems!

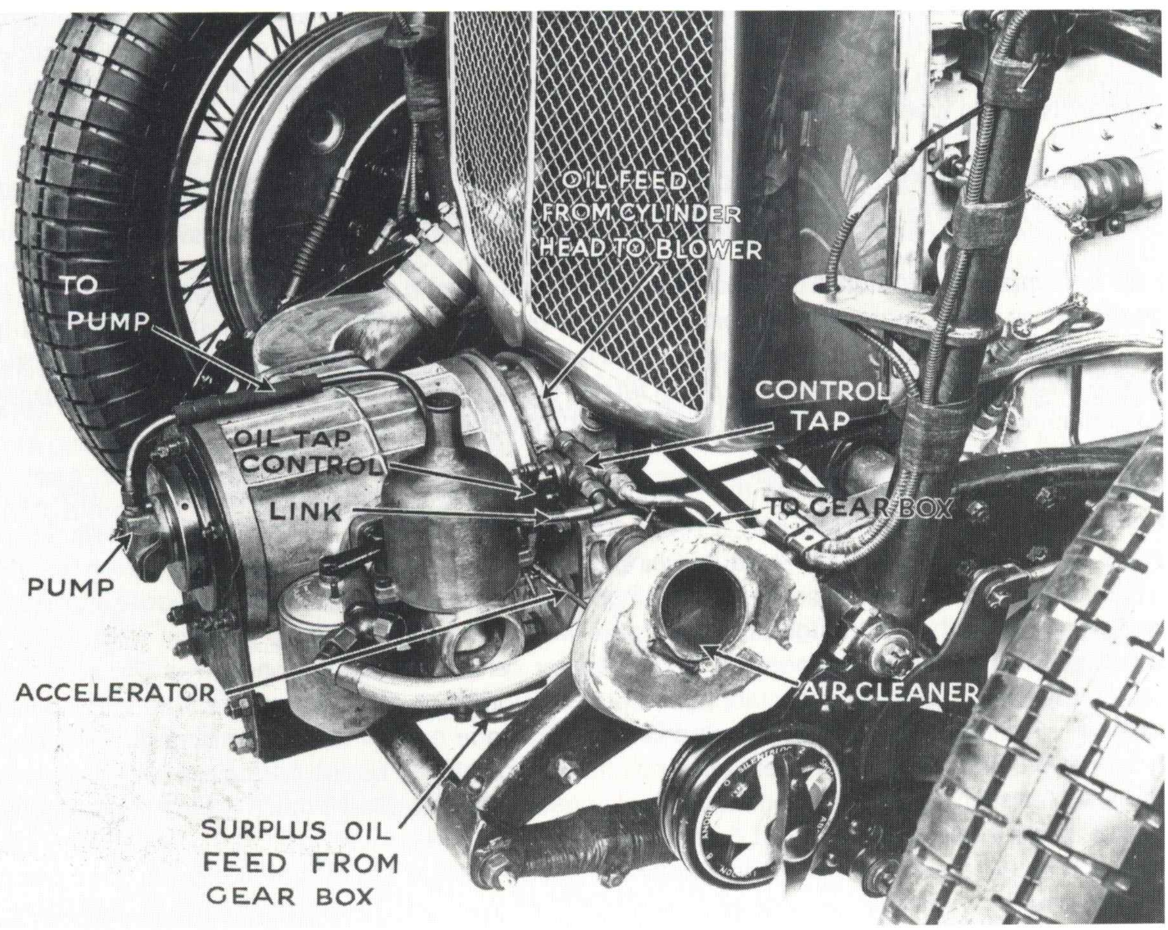
The contemporary reports relating to the development of the K3 tell us that when the initial design was prepared the then new six-cylinder engine being produced for the L-type and the touring versions of the K-type had never been run in supercharged form. It should be remembered, however, that by this time the MG Development Team had considerable experience of blown engines and their use in long distance racing, and record breaking. Abingdon's knowledge at this time was probably what we would today call 'state of the art'. Even so when the weight of the newly designed car was calculated and the amount of power needed to propel it at the required speed became known one imagines that even the most confident amongst them would have been a little nervous.

The new K/L engine had been designed to replace the old F-type which was in fact not an MG engine at all. Its ancestry from the World War 1 Hispano Suiza aero engine through Wolsley is clear. There was no reason to change its excellent fundamental design. There was, however, a need to improve the many weaknesses which the F version had shown up. The new engine posessed great stamina and the potential for continuous development as both a racing and touring unit, and in both supercharged and atmospheric forms. In company with its four-cylinder derivative which powered the P, Q and R-series cars it was regrettably the only genuine MG engine ever designed.

The crankcase/cylinder block unit was cast in high grade iron with quite thin sections keeping weight



K3003 Illustrations of the blower installation for the factory handbook.



down. The walls of the crankcase extended well below the line of the crankshaft, and were bridged by the intermediate main bearing housings. This formed an incredibly stiff support structure for the four main bearing crank and ensured good alignment of all the major components. The reduced friction resulting from this rigidity was a major factor in the engine's ability to produce its high performance. Good support meant that the crankshaft could be fairly light in design with low inertia. Production cranks had no counterbalance. The connecting rods were also light, well designed forgings and the complete assembly was quite happy operating at speeds up to 6000 rpm. The addition of a supercharger required heavier pistons and in turn heavier rods to cope with the extra inertia loads, interestingly though the sizes of the bearings did not change until right to the end of the production period and were completely reliable. In order to allow the use of extra revs. special cranks were produced by Laystall and by Ambrosia (both specialist manufacturers of these items at the time). The use of counterbalance in these designs helped the smoothness at high rpm - up to 8000 - but with the result that many cases of broken rods were experienced. When the R engine was designed even stronger rods were included and many K3s were fitted with these at that time but even these were known to fail just above the big end eye when really highly stressed.

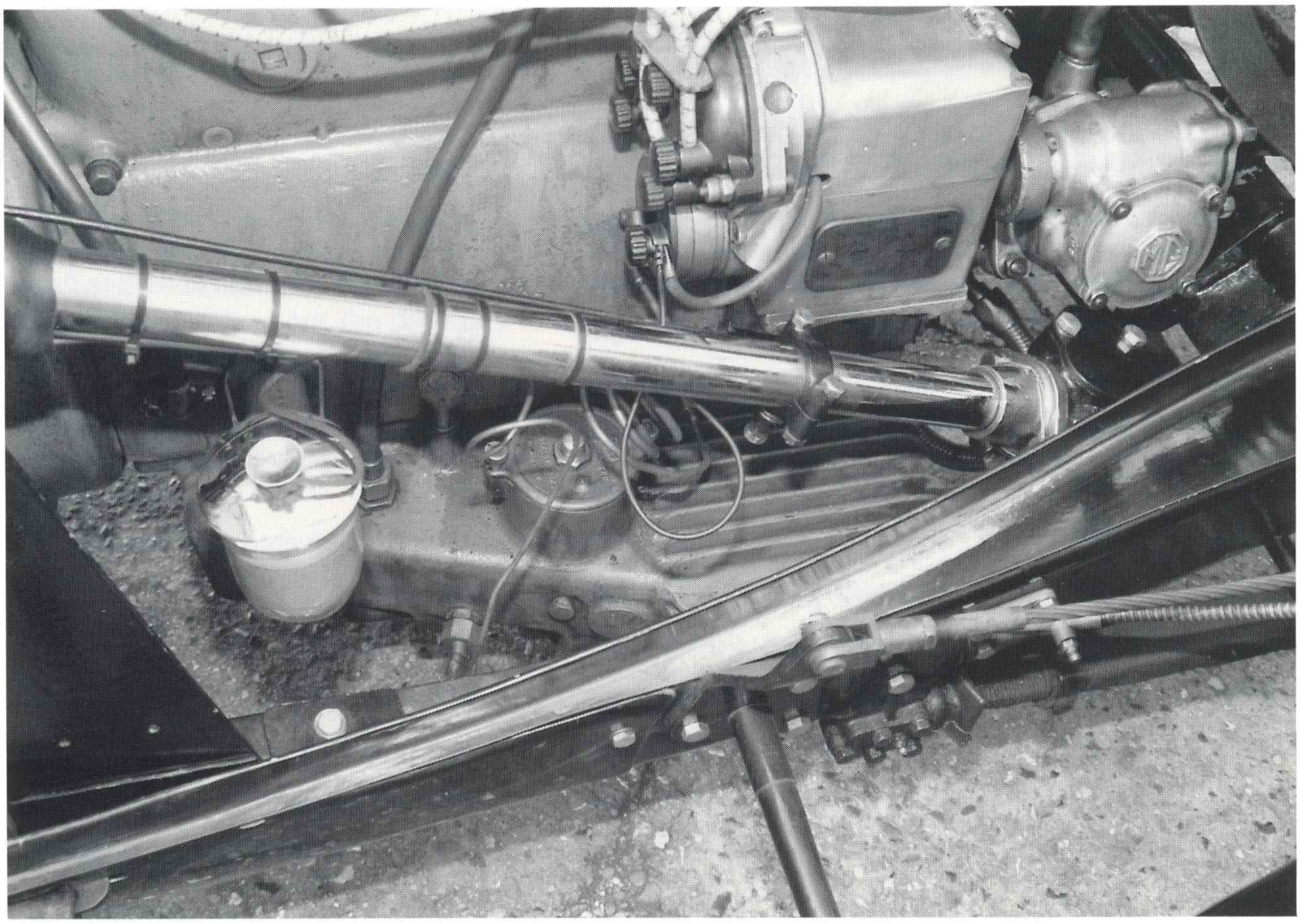
The front end of the engine was formed as a gear case - a superb multifunction housing of great elegance providing drives and mounting platforms for all the ancilliary components. On the top face, driven by a bevel gear from the crank, sat the dynamo the upward extension of whose armature provided the camshaft drive. On the offside shoulder a skew gear drive operated the magneto via a secondary gearbox. On the nearside shoulder another skew gear drove the water pump. Underneath on the nearside was mounted the oil pump, splined into the bottom of the magneto drive gear. On the front face was the front engine mounting which also housed the constant velocity coupling for the supercharger.

Initially the K3 was equipped with a Powerplus supercharger. Like all vane types this was efficient but very touchy in the lubrication department. Too much oil resulted in lots of smoke and oiled plugs, too little produced rapid seizure and end of race. The difficulty of calculating the oil comsumption of both blower and engine resulted in the production of a huge electron sump fitted with a float feed device from an SU carburettor and fed from a bulkhead mounted oil tank. Total oil capacity of the entire system was about 6 gallons. The result being that the weight of the sump, tank and oil added over 100lbs to the car, and the oil hardly got to working temperature.

The Powerplus was soon discarded in favour of the much more reliable Marshall 85, however, the large sump and its feed system remained in place throughout the production run.

One of the more important features of the engine was the use of the crossflow cylinder head. This had been introduced on the C-type and become standard on the J. The improvement in breathing had resulted in a dramatic increase in power output and it was naturally carried on into the new 6-cylinder engine. The new design incorporated a much larger diameter camshaft carried in more substantial housings continuing the idea of strength and rigidity in the mechanical parts.

The problem of cracked valve seats on the supercharged engines was never eradicated. The valves are very close together which leaves only a very narrow landing between the seats. The thermal shock between the cool inlet valve and hot exhaust being absorbed in this narrow strip of iron often results in cracking. Eventually bronze cylinder head castings were tried and enjoyed some success despite a substantial weight penalty. Although power outputs well in excess of 150bhp per litre were achieved with special versions of these engines the limiting factor on the production ones was the size of the valves, and because of the previously mentioned proximity to each other there was little to be done to change things. Alcohol fuels were often used in short distance events with great benefit. The better internal cooling provided by these fuels allowed the use of higher boost pressures with a resulting considerable increase in power. The penalty in fuel consumption required a much greater quantity to be carried (a K3 on methanol travels about 4 miles per gallon). The conversion from one fuel to another was remarkably easy, however, requiring merely the substitution of the jet and needle in the carburettor and minor revision to the ignition setting.



K3011 The larger, later-style, sump fitted now to most of the remaining cars.

The engine's crankshaft was coupled directly to the input shaft of the preselector gearbox - no clutch was used. This gearbox proved to be the K3's secret weapon. There was a certain amount of trial and error involved initially to arrive at a set of ratios which matched the engine power curve to the weight of the car. Once this was done the car's driveability became legendary. Consider the advantages provided by instantaneous gear changes achieved without having to release the steering wheel at a time when everyone else was wrestling with gearboxes that belonged in tractors. The ENV 75 was a beautifully made box and would handle the 120BHP of the standard K3 quite happily. Although the more highly developed cars discovered where its limitations lay, provided it received regular maintenance it was exceptionally reliable.

The finished car was stunning in every respect. It looked magnificent, the detail finishing was superbly crafted, the sound was unforgettable. To attempt to describe how the car felt when driven in anger leaves one searching for superlatives. It has no vices and is extremely forgiving. The engine pulls like a train from 3000rpm up to 8000 plus. The whole experience is unforgettable. The K3 is a genuine thoroughbred.

AS IT WAS IN THE BEGINNING.

CHASSIS NUMBER	ENGINE NUMBER	DATE OF ISSUE OF GUARANTEE PLATE	TYPE OF BODY	UK REGN. NUMBER	
K3751	KEX3	26.10.32	C-Montlhery	JB 1046	
K3752	10AK	4.1.33	Mille Miglia	JB 1269	Initially with cowled radiator
K3001	18AK	28.4.33	Mille Miglia	JB 1472	
K3002	23AK	28.4.33	Mille Miglia	JB 1474	
K3003	25AK	28.4.33	Mille Miglia	JB 1475	
K3004	16AK	30.3.33	Mille Miglia	JB 1411	
K3005	20AK	15.3.33	Eustace Watkins	AGT 235	Delivered as a chassis.
K3006	24AK	28.4.33	Mille Miglia	AGO 507	
K3007	28AK	26.5.33	Mille Miglia	none known	
K3008	27AK	24.5.33	Mille Miglia	AGW 37	
K3009	532AK	not known	Mille Miglia	none known	
K3010	530AK	31.5.33	Mille Miglia	MG 2502 (probably)	
K3011	31AK	9.6.33	T.T. Pointed tail	none	MG 3570 issued on return from U. S. A.
K3012	593AK	14.7.33	Mille Miglia	none	Exported to Germany.
K3013	613AK	23.9.33	Mille Miglia	AML 103	
K3014	612AK	6.9.33	Mille Miglia	none	Exported to Switzerland.
K3015	7AK	2.11.33	Mille Miglia	JB 3180	
K3016	1AK	12.3.34	Mille Miglia	JB 3181	
K3017	604AK	12.3.34	Mille Miglia	JB 3182	
K3018	618AK	23.3.34	K2, swept wings	BPD 403	
K3019	616AK	26.3.34	Single-seat	none	Exported to Italy as chassis.
K3020	615AK	12.4.34	Pointed tail	JB 4184	
K3021	617AK	10.4.34	Pointed tail	none	Later DGJ 556
K3022	614AK	10.4.34	Pointed tail	none	Later HPJ 870.
K3023	29AK	not known	Humbug and Coal Scuttle	none	EX.135
K3024	619AK	10.4.34	Pointed tail	BLY 507	
K3025	624AK	17.4.34	Pointed tail	BNP 2	
K3026	620AK	17.4.34	Pointed tail	none	Exported to Czechoslovakia.
K3027	628AK	17.4.34	Pointed tail	BLT 703	
K3028	623AK	19.5.34	Pointed tail	AYH 202	
K3029	621AK	16.6.34	Pointed Tail	none	Exported to France
K3030	630AK	16.6.34	Pointed tail	none known	
K3031	627AK	20.9.34	Pointed tail	none	1934 Motor Show. To Holland.