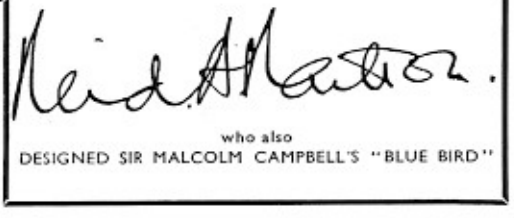
THE NAPIER-RAILTON

BY ITS DESIGNER



who also
DESIGNED SIR MALCOLM CAMPBELL'S "BLUE BIRD"

THE car was designed to fulfil two purposes, (a) to be capable of putting up a really fast lap at Brooklands in short races and (b) to possess sufficient stamina to run for 24 hours continuously at a speed in the neighbourhood of 120 m.p.h.

These requirements are to some extent conflicting and the car is, therefore, an attempt to compromise between the two.

As the cost of a special engine was out of the question, we had to use an existing engine of some sort, and our choice fell on the Napier Lion Aero engine as being about the only suitable British engine capable of producing 300 h.p. continuously with good reliability.

The only drawback is that it is, if anything, rather unnecessarily powerful for the job. At speeds of 120 m.p.h. it is running on about half-throttle.

Given its head, on a straight road, the maximum speed would be about 170 m.p.h.

The oil and fuel tanks are of 15 and 65 gallons capacity respectively, and carry supplies for two and a half hours running, at the end of which period it will, in any case, be necessary to stop and change the tyres.

The fuel is fed to the engine by a constant-delivery fuel pump, and the surplus returned to the tank by a separate pipe. This pump is built into the engine.

There are two oil pumps, one to feed the bearings direct from the tank, and one to return the oil from the sump to the tank.

The underside of the oil tank is heavily ribbed, both to strengthen it and to assist cooling.

The engine is water-cooled by a honeycomb radiator in the normal position. Loss of water by surging is prevented by leading the overflow pipe to a separate tank, which is connected by a small bleed pipe on the suction side of the main pump.

The engine can be started by a hand-cranking gear used in conjunction with a hand-starting magneto. In the car, however, it is not necessary to use this, as the engine is easily started by pushing the car in second gear and letting in the clutch.

The clutch is a single plate of normal design.

The gearbox is very compact for the amount of power transmitted. This is done by using very high tooth pressures and a very strong tooth form, and is only permissible where the gears are only used for getting away, and not climbing hills. There are three speeds, operated by a small remote control lever. A small parking brake is fitted at the back of the gearbox. No reverse is fitted, as this is only necessary when a car is driven on a public road.

The propeller shaft is universally jointed at both ends. The forward joint also allows for sliding.

The rear axle body is built up in three sections machined from high tensile steel forgings. The axle ratio is 1.66 to 1, with straight tooth bevels. A differential gear is used. An elektron oil sump is bolted to the underside of the axle casing to increase the oil capacity.

The rear hubs are of fully-floating construction.

The brakes are on the two rear wheels only, and are cam and rod operated from the pedal. This may seem at first sight a retrograde step. Actually, for track work, the brakes are only used for pulling up after a race or at the replenishment depot. Rear wheel brakes are quite powerful enough for this. It also relieves the front axle from the weight of the brake gear, which in itself is all to the good from the point of view of steering and road-holding.

The rear suspension is effected by four cantilever springs, two on each side. The axle is hinged to the rear ends of these four springs, which in this way take all the braking and driving stresses. The arrangement reduces the stresses in the axle casing, and makes the working conditions of the universal joints much easier. It also maintains the axle position in the event of a broken spring leaf.

The front springs are the normal half-elliptic, shackled at the front end. Short radius rods are fitted under the front axle. These keep the castor angle constant and at the same time simplify the steering layout. They also maintain the axle position in the unlikely event of a broken spring.

The front axle is tubular, made up in three pieces. Steering gear is normal throughout. A worm and wheel steering box is used.

The frame is underslung at both ends, and the major cross-members are tubular.

The engine is mounted on a sub-frame and is three-point suspended, the two points being at the front.

Four frictional type shock-absorbers are fitted to each axle.

The car is fitted with a dynamo, belt-driven off the clutch shaft, a battery and two headlights, for use in long distance runs necessitating night driving.

The complete car, with tanks empty, weighs 37 cwt.

Some idea of the power of the engine may be got from the fact that even on a concrete surface the driving wheels spin even in second gear if the throttle is opened fully.

The chief factor in any record attempts with this car will be the life of the tyres. This alone will settle the number of stops that will be necessary. The more stops, the faster the car has to go in between, which in turn shortens the tyre life still more, and so on in a vicious circle.