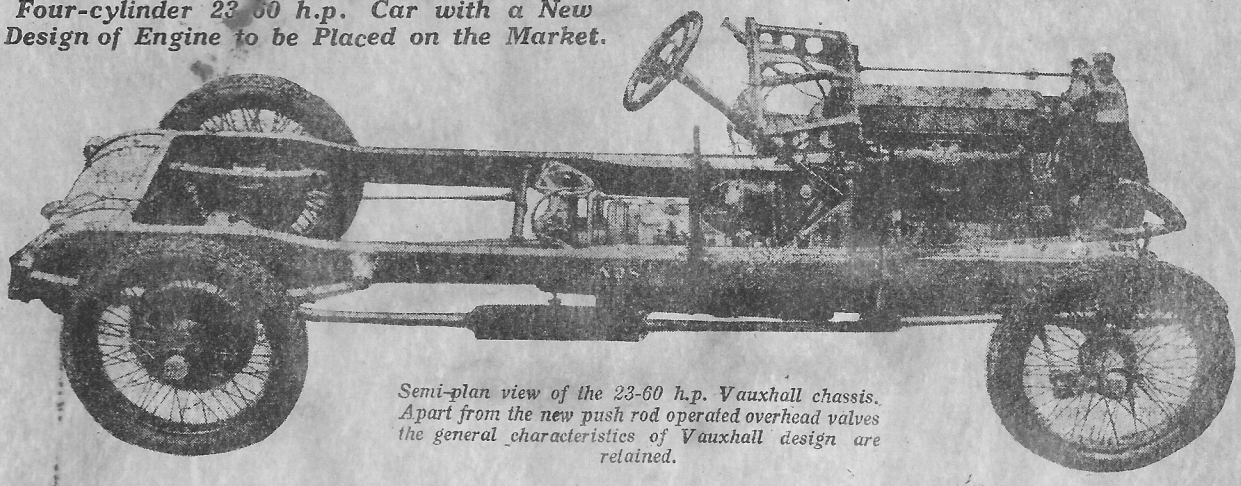
AN OVERHEAD VALVE VAUXHALL.

Four-cylinder 23-60 h.p. Car with a New Design of Engine to be Placed on the Market.



Semi-plan view of the 23-60 h.p. Vauxhall chassis. Apart from the new push rod operated overhead valves the general characteristics of Vauxhall design are retained.

FOR some time it has been expected that an overhead valve engine would be developed by Vauxhall Motors, Ltd., Luton, Bedfordshire, in spite of the fact that the fame of the 30-98 h.p. side valve engine car stood high and was based upon its speed and power. Experiments have been proceeding with various types of overhead valve engine, some with overhead camshafts, some with push rods, and a new design has now been decided upon which is to be called the 23-60 h.p. Curiously enough, it is not to be used in the sporting cars, but is to take the place of the ordinary 25 h.p. touring model, though its speed and power will almost make the car rank as a sporting model in any case, and it is likely on that account to become popular.

SPECIFICATION.

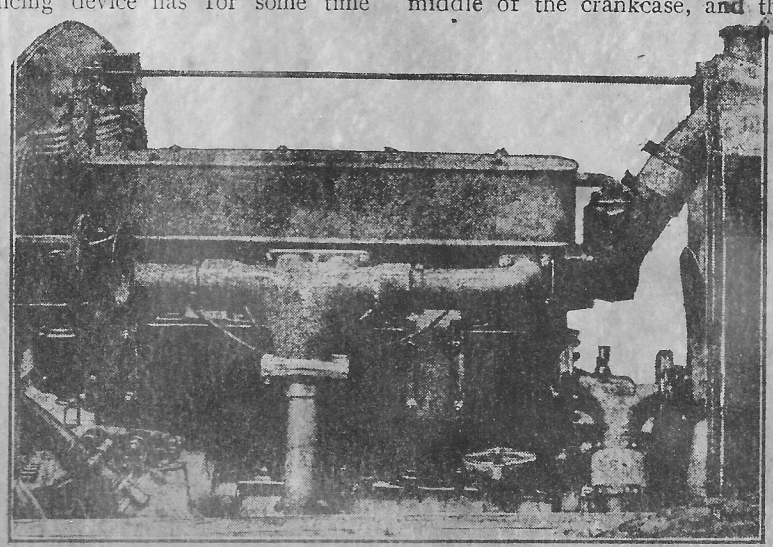
ENGINE : 23-60 h.p., four cylinders, 95 × 140 mm. (3,969 c.c.). Treasury rating 22·3 h.p. Tax £23. Magneto ignition, overhead valves.
TRANSMISSION : Four-speed and reverse gear box separate from crankcase, spiral bevel final drive.
SPRINGING : Semi-elliptic front and rear springs.
WHEELS : Detachable steel. 880 × 120 mm. tyres. Wheelbase, 10 ft. 9½ in. Track, 4 ft. 8 in.
WEIGHT : Chassis, 26 cwt.
PRICE : Complete, £1,150.

The Lanchester Balancer.

The new engine differs widely from its predecessors, and has many interesting details of design. The aluminium crankcase is very similar, it is true, to that of the earlier engine, and the Lanchester balancing device has for some time been fitted to the 25 h.p. cars. This device was, it will be remembered, produced some years ago, and a paper concerning its merits was read before the Institution of Automobile Engineers. Space does not permit of our describing in full the theory of the device, but it will suffice to state that, owing to the fact that the connecting rods introduce an irregularity of movement into the action of the pistons of any four-cylinder petrol engine, there is an unbalanced force which tends to move the engine in a vertical plane, and which may, if severe and disregarded, cause very considerable vibration at high speed.

The Lanchester balancing device consists of a gear wheel, attached to a flange on the centre of the crankshaft, driving two small gear wheels to which are attached weights similar to the counter-balance weights sometimes used for the crankshaft webs. This assembly is plainly shown in the sketch. The weights are so set in relation to each other that when at the top or bottom of their circular paths they combine to set up a force which cancels the force set up due to the angularity of the connecting rods. When the weights are in any position other than at the top and bottom of their paths they act against each other, instead of together, and their effect is neutralised, which is exactly the object sought by the designer.

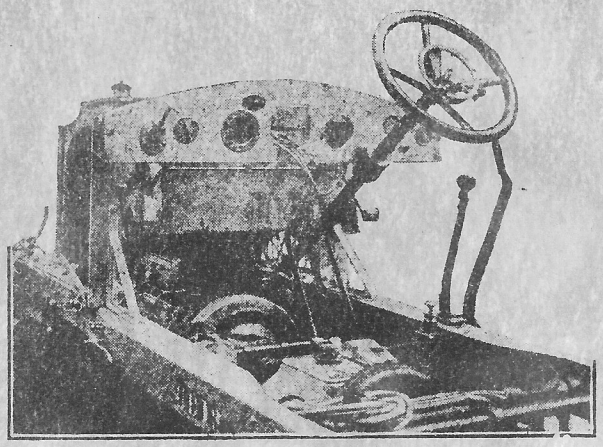
In the Vauxhall engine the device is placed in the middle of the crankcase, and the weights consist of small cylinders drilled and filled with white metal, the amount of metal used being ascertained from a chart after the aggregate weight of the pistons, rings, gudgeon pins, and the small ends of the connecting rods for that particular engine have been obtained.



In the water outlet pipe is the chamber containing the thermostat. The aluminium plates on the side of the cylinders conduct water to the head.

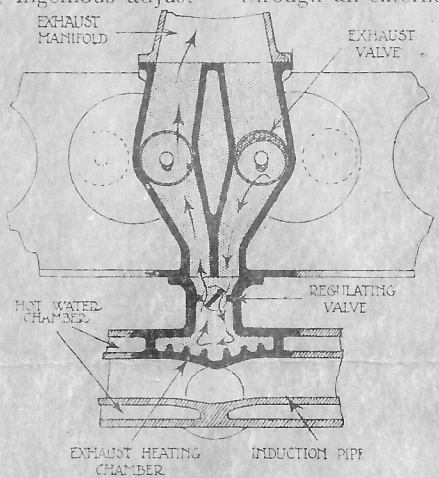
Engine Details.

There are five plain bearings for the crankshaft, and at the nose of the engine is a chain which distributes the power to the camshaft and to



Centre portion of the 23-60 h.p. Vauxhall chassis. Though altered considerably in detail, the gear box and transmission brake are, it will be seen, practically the same as those of the 25 h.p.

the magneto-shaft. Since this chain becomes slack after a time it is provided with an ingenious adjustment. In the side of the timing case the bearings of the magneto-shaft are held by eccentrics, the shaft really extends to the rear to drive the magneto, and to the front to drive the fan pulley. Each eccentric, normally, is locked to the timing case, while the magneto platform is a part of the rear-most eccentric, and both eccentrics are connected together by a bar. It is only necessary, therefore, to slack back the lock nuts and to move the bar, in order to shift the whole of the magneto driving shaft, together with the magneto and the fan pulley, sufficiently to one side to adjust the slack of the chain, the tension being judged through a hole in the timing case.



Diagrammatic section of the centre cylinders, showing how the exhaust gases pass from one cylinder into a chamber round the inlet pipe, and out again.

External Water Pipes.

Cylinders and jackets are an iron casting bolted to the crankcase, and have on one side a special chamber through which pass the push rods. The head is a second iron casting, and the joint between it and the cylinders is made by a plain aluminium plate. In this the designers have been helped by the fact that the water in the main cylinder jackets reaches the head through large external aluminium pipes, and not through holes in the gasket, and for this reason the gasket is not of a complicated shape.

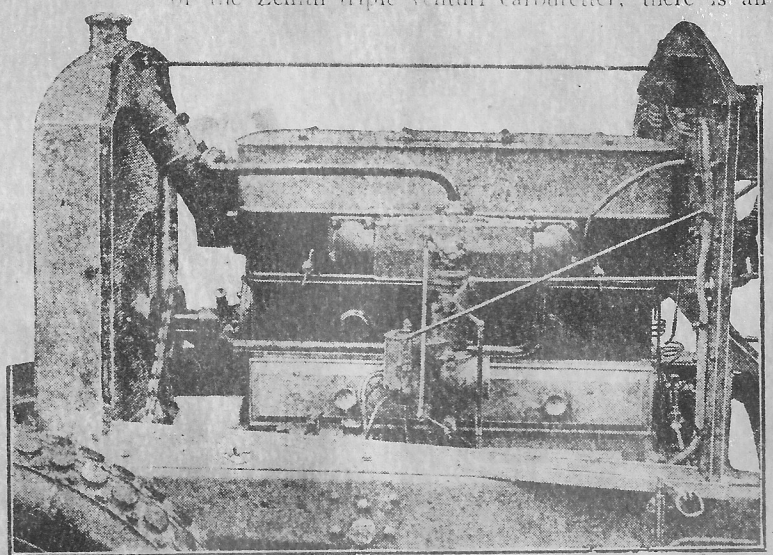
There are two valves for each cylinder, operated by rocking levers, and in order that the clearance between the rocking lever and the valve shall not increase greatly as the engine becomes heated the push rods are of duralumin. Duralumin expands more rapidly than the cast-iron of the cylinder, and as the push rods are enclosed by the casting they receive sufficient warmth to cause the right expansion. At the top and bottom of the push rod, which is hollow, case-hardened pieces are riveted to receive the tappet on one end, the adjustable portion of the rocking lever on the other, while the whole push rod is provided with a return spring which keeps it in engagement with the tappet.

Lubrication System.

It is curious to find cast-iron pistons in this very modern engine, and it is interesting also to notice that the white metal big-end bearings are entirely devoid of oil grooves, oil being supplied to each big-end under pressure through a drilled crankshaft, and on the side of the bearing which is not taking a high load. This particular type of engine will be the first to be fitted with a new oscillating cylinder plunger oil pump, driven from the end of the camshaft by the same crank that is used for the piston of the air pump which supplies pressure to the main fuel tank. Oil is drawn through a filter from the sump, and delivered to all the bearings under pressure.

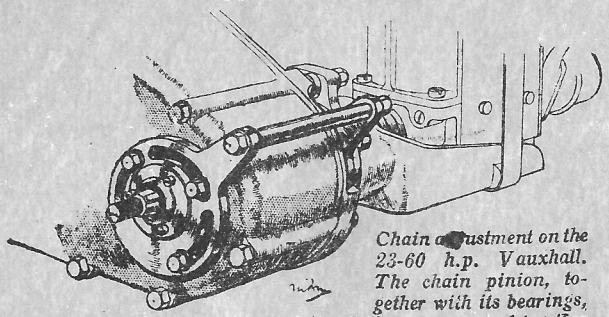
A large Zenith carburetter feeds the valve ports through an external Y pipe, the system adopted being particularly interesting because the designer has made certain that the inlet pipe will remain hot enough in all circumstances. By turning a special tap, exhaust gases from Nos. 2 and 3 cylinders enter a special jacket round the pipe, but quite apart from this there is a water-heating system as well. To effect this, advantage has been taken of the thermostat which now finds a place in the circulation system, for when the thermostat restricts the flow of water to the radiator all the water which is by-passed goes to the inlet pipe jacket, and thence returns to the water pump, which is a large centrifugal instrument driven by the fan spindle. Both the exhaust or water heating, or both, can be used for the inlet pipe.

In addition to the fuel control, which is a part of the Zenith triple venturi carburetter, there is an



Intake side of the 23-60 h.p. Vauxhall. The push-rods for the overhead valves are concealed within the castings for the cylinder jackets and head.

extra air valve in the inlet pipe which can be controlled by the driver with, we are informed, excellent results. On the opposite side of the engine to the



Chain adjustment on the 23-60 h.p. Vauxhall. The chain pinion, together with its bearings, and the whole of the magneto and its platform, are moved together after slacking the lock nuts.

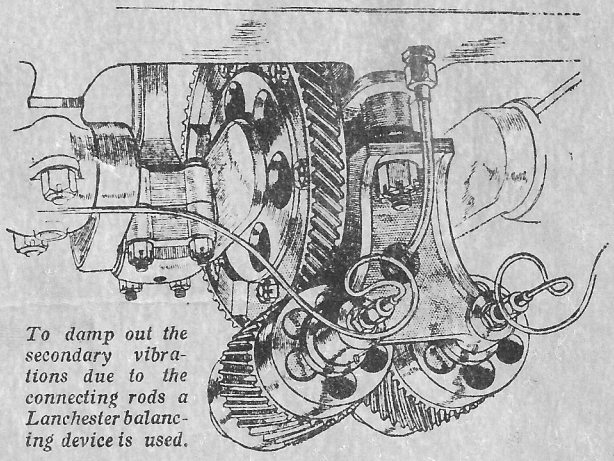
carburetter is an external exhaust pipe with a branch for each cylinder; the branches for Nos. 2 and 3 cylinders are combined to form one pipe, which is inside another pipe conveying the exhaust gases of Nos. 1 and 4 cylinders, so that the exhaust of one pair of cylinders tends to assist the escape of that of the other pair.

Two minor details which are interesting are that the oil level indicator is operated through a float and hinged balance lever in the crankcase, while the by-pass valve which limits the pressure of oil in the circulation system feeds the timing gear. It will be seen that every point of the engine design, for which Mr. C. E. King is responsible, is full of interest.

To give some idea of the engine's performance, the horse power registered on the brake at 2,000 r.p.m. is 50, and all the way up its power curve there is considerable increase over the old side valve 25 h.p. The maximum speed of the engine is higher, though its compression is quite normal, and not the least interesting feature is that its crankshaft speed is a matter of some 2,800 r.p.m., which seems strange in these days of very high speed engines, until one remembers that the capacity is close upon four litres.

The remainder of the chassis is practically unaltered. There is a multi-disc clutch, and the four-speed gear box is entirely separate from the engine. The principal alterations, in fact, which have been made of late years to the gear box are that the forward end of the driving shaft is supported by a roller bearing instead of a ball bearing, though a ball bearing is still used just behind the constant mesh gear, and a thrust bearing is placed close to the roller race. One brake consists of shoes expanding in a drum on the tail of the gear box driven shaft, the other of similar shoes on the rear wheel hubs. The propeller-shaft itself is open, and has a De Dion type sliding joint at the rear of the ordinary bush and pin universal joint at the front. The spur differential is still retained with a spiral bevel final drive.

On the whole, the latest design betrays considerable evidence of care, is obviously in no way an experimental machine, but one which has been tested for a long time before it was decided that it should form a part of the production programme, and should considerably enhance the reputation of the manufacturers of the Vauxhall cars.



To damp out the secondary vibrations due to the connecting rods a Lanchester balancing device is used.

LIGHT CAR RACES IN FRANCE.

RULES for the French Cycle Car Grand Prix Race, the official event of this kind for the year, have just been issued, and show that this speed contest will be held on the course at Le Mans on September 16th. Both 750 c.c. and 1,100 c.c. cycle cars are admitted, the distance for the former being about 185 miles and for the latter about 245 miles. The race is organised by the Union Motocycliste de France, and is open to both manufacturers and private owners. Entries are received until August 12th at ordinary fees, namely, 500 francs per machine, and until the evening of September 1st at double fees. The course is the well known triangle just on the outside of Le Mans, which has been the scene of many previous races. Starting positions will be decided by the drawing of lots, the first car being sent away at the rather unusual hour of 1.30 p.m.

On the day following the cycle car race, and over the same course, the International Light Car Race will be held. This event will be open to 1,500 c.c. machines having a maximum weight of 500 kilos. (1,102 lb.). Thirty-five laps of the course will have to be covered, giving a total distance of 375 miles. No changes in the rules have been made since last year, when this race was won by Talbot-Darracq. The entry fees, which should be sent to the Automobile Club de l'Ouest, at Le Mans, are 2,000 francs for one car, 3,500 for a team of two, 5,000 for a team of three, and 1,500 francs for each succeeding car of the same make. Entries close on the evening of August 17th.

NEWS CULLED FROM ADVERTISEMENTS.

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