Lanchester LD10 Engine Technology

The following is an extract from the 'Automobile Engineer' November 21st, 1946

The 10 h.p. Lanchester engine has received attention particularly in the design of the cylinder head and valve ports. Maximum turbulence and elimination of hot-spots is claimed for the combustion chambers, and there are ribs projecting into the water jacket. The water is circulated through a longitudinal tube which directs it on to the exhaust port areas and around the sparking plus bosses.

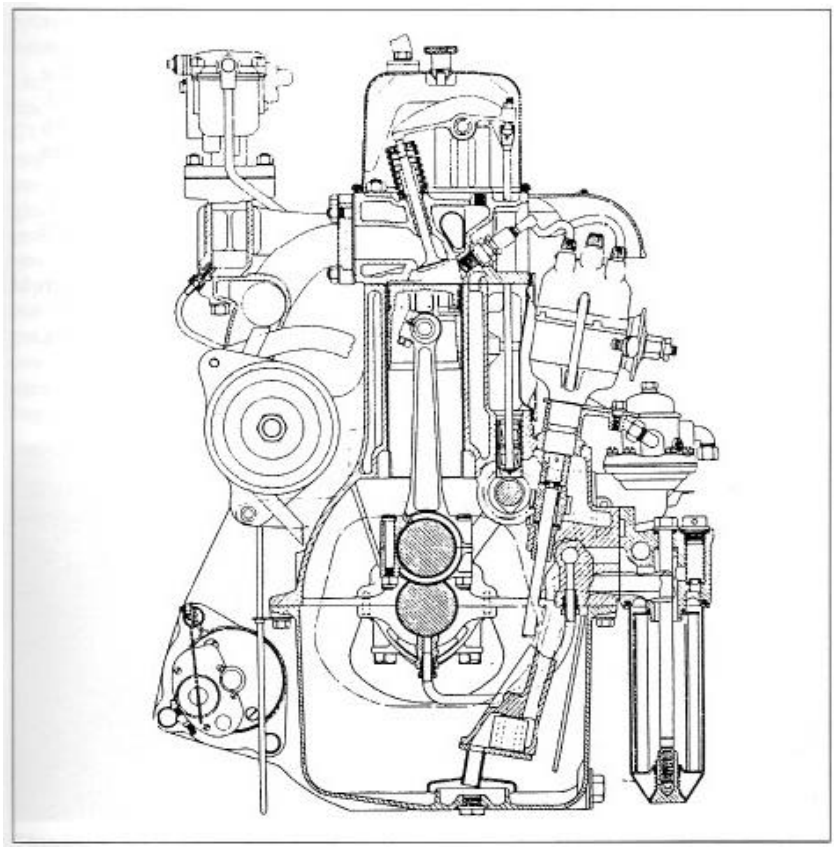
The four cylinders and crankcase are formed integrally, the bore and stroke being 63.5 mm and 101.6 mm. giving a total swept volume of 1,287 c.c. With a compression ratio of 7.4 to 1. the maximum out-put is 40 b.h.p. at 4,200 r.p.m.

Brivadium dry liners are fitted to the cylinder bores and water is circulated by thermo-syphon and impeller. This is mounted on the front face of the cylinder head and is of the centrifugal type. A two-bladed fan is attached to the forward end of the impeller spindle which is carried on two separate ball races. For the lubrication of these bearings a grease nipple is provided and a vent in the pump body prevents over lubrication. The V-belt drives the pump, fan, and dynamo on the off side of the engine, the dynamo mounting being adjustable for regulating the belt tension.

Three main bearings of the steel-backed white-metal precision type carry the crankshaft which has balance weights integral with the webs. The usual "I"-section steel stampings are employed for the connecting rods, which are fitted with precision type bearings with side flanges to prevent lateral movement of the big-ends. The gudgeon pins are fixed in the connecting rods by pinch bolts, and the die cast heat-treated light alloy pistons have flat crowns and "T" slotted skirts. Each piston carries three tapered, hardened and tempered compression rings and a drilled grooved scraper ring for oil control, all located above the gudgeon pin.

The gear type oil pump is submerged and driven at half engine speed by skew gearing from the camshaft, the pump spindle being extended upwards to actuate the distributor in the usual manner. Oil passes from the pump at a pressure of 40lbs per sq in to a full flow filter in which the pressure control valve is incorporated and thence through separate oil pipes to the three main bearings. The big-ends are supplied through oilways drilled in the crankshaft and oil holes are provided from the main bearings to the camshaft bushes. From the front camshaft bearing there is an intermittent feed to the double roller chain driving the camshaft, while the rear camshaft bearing gives a similarly intermittent feed to the valve rockers by means of an external pipe which delivers oil to the hollow rocker shaft. In each rocker bearing there is a small hole through which oil runs to the valve stem and rocker ball.

The valves are slightly inclined towards the off side of the engine, and the 14 mm. long-reach sparking plugs are set at an angle on the near side and located between the two valves with a slight bias towards the exhaust valves. The inlet and exhaust pipes are separate and the inlet manifold has four branches from the central passage to which the Zenith downdraught carburettor is bolted.

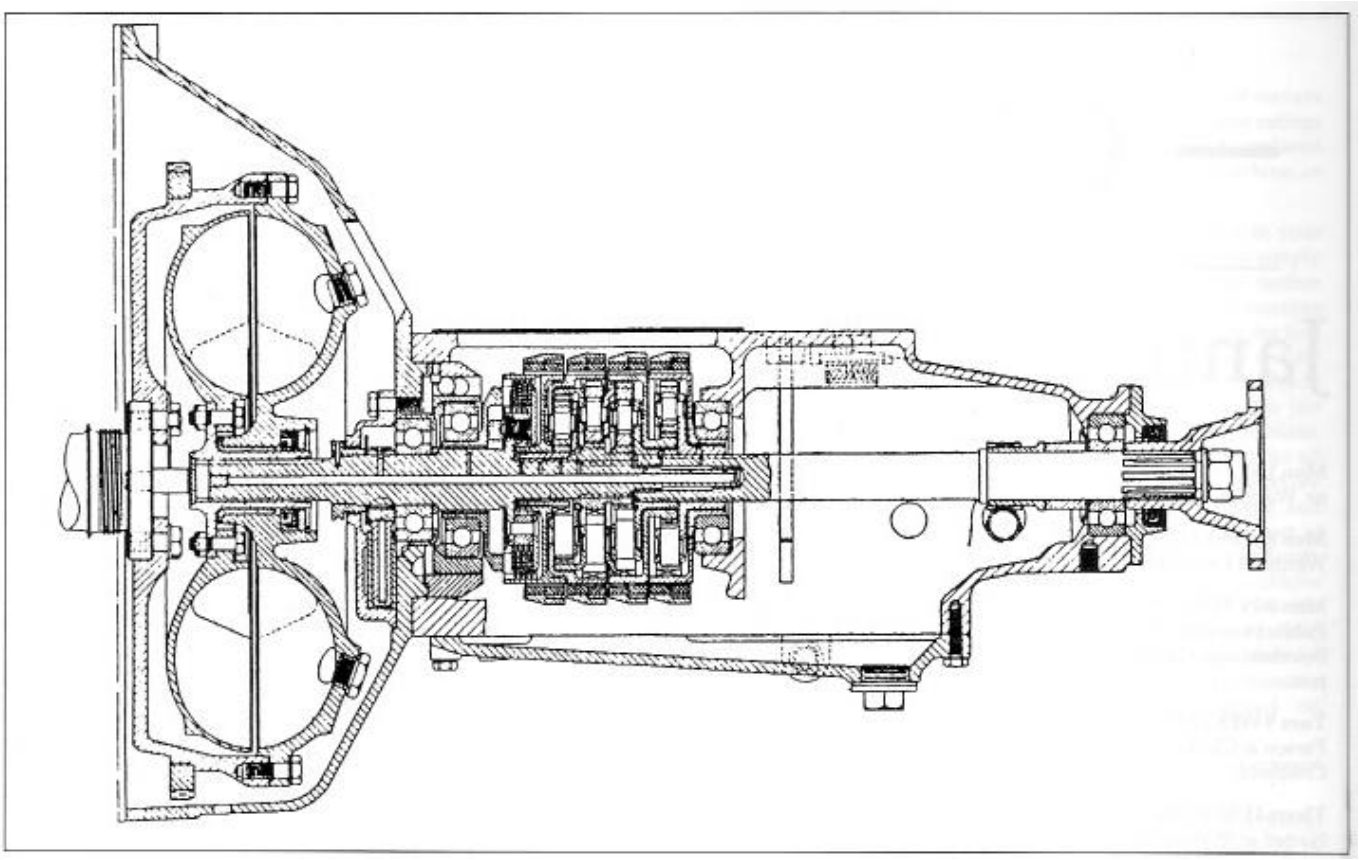


Lanchester 4-cyl. engine with dry liners.

The new 10 h.p. chassis incorporates the well-known combination of fluid flywheel and preselective epicyclic change-speed unit, both being similar in design to the units employed in the Daimler chassis, though, of course, with appropriate dimensional differences. There are modifications also in the design and construction of the gear casing for which die-castings are utilized as also for the various cover plates, thus giving a very clean finish and reducing machine work to a minimum.

Improvements resulting from war-time experience with the Daimler armoured fighting vehicles are embodied in the fluid flywheel which is of the multi-vane open circuit type with a larger expansion space than hitherto. The result is a greatly improved slip curve but a reduction of the actual slip when taking up the drive to 2 per cent. The flywheel housing and its runner member are now die-castings, high-tensile light alloy being used for the impeller.

The overall gear ratios with the spiral bevel final reduction are: top gear. 5 to 1; third, 7.55 to 1; second, 11.65 to 1 and first. 21.4 to 1.

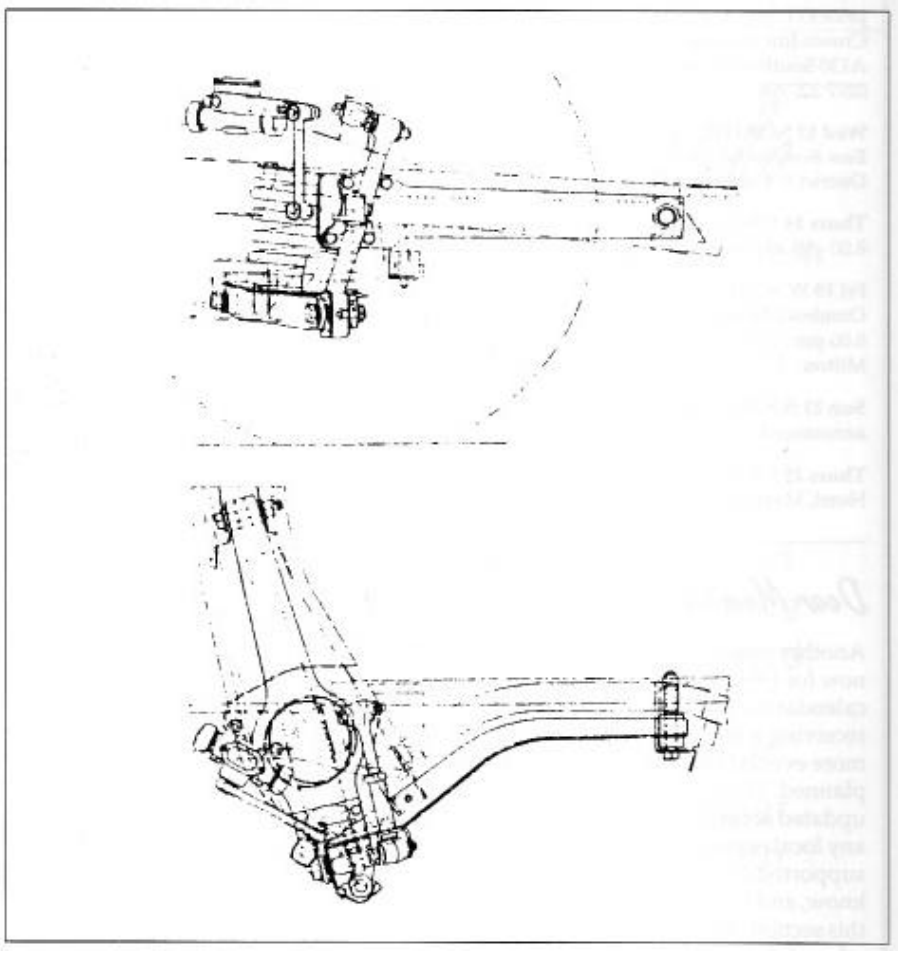


Fluid flywheel and preselective epicyclic gearbox on Lanchester chassis.

The system of independent front wheel suspension employed on Lanchester and Daimler cars embodies helical springs, upper and lower links with radius rods combined with suitable formation of the frame to accommodate the whole layout. At the forward end of each side member is a robust channel pressing which sweeps outwards, the outward extremities being joined by a generously proportioned cross-member forming the upper anchorages of the two helical springs. Pivoted to the centre of this cross-member are the two lower links to which the lower ends of the helical springs are secured, while the outer extremities of the links are pivoted to the lower bosses of assemblies having integral stub axle swivel bosses.

At their upper ends these members are linked to adjustable transverse rods anchored to the upper flanges of the frame cross-member. The two radius arms follow the curvature of the outswept extension of the main frame to which they are pivoted at their rearward extremities. Their forward ends are secured by bolts to a rectangular face on the stub axle swivel assembly.

Piston-type hydraulic shock absorbers are mounted on brackets attached to the main cross-member to damp the oscillations of the helical springs and to reduce the number of working parts that would otherwise require frequent lubrication. Silent-bloc bushes are used extensively throughout the system.



Lanchester helical spring suspension.