

The Renault 4-cylinder in-line air-cooled engine develops 80 b.h.p. at 1,800 r.p.m.

in the head, diametrically opposite, at front and rear. The crankcase centre portion is made in one piece, the cam gear being housed in a separate casing. The two four-lobed cams rotate at one-eighth engine speed in the reverse direction to that of the crankshaft. The latter is in one piece and is supported by two roller bearings and one ball thrust bearing. The master rod big-end is of the split type, the rod being of H section, whilst the auxiliary rods are tubular.

The two S.E.V. magnetos are mounted transversely on brackets cast integral with the cam gear housing, the other auxiliaries being located at the rear of the engine. Lubrication is provided by two gear-type pumps, the scavenge pump passing oil to jackets surrounding the three induction pipes leading from the triple Zenith carburettor to the bottom of the induction chamber. The air intake is exhaust heated. Provision is made for the inclusion of a Viet gas-starting distributor. The weight of this engine is 550 lbs. complete.

The 80-h.p. model is a neat light 'plane engine, though at 319 lbs. it appears to be somewhat weighty. We understand, however, that the engine shown is not of the latest type, an improved model, which develops 100 b.h.p. for the same total weight, now being in production. The engine at Olympia has a bore and stroke of 115 mm. and 140 mm., the outputs being 70 b.h.p. at 1,700 r.p.m. and 80 b.h.p. at 1,800 r.p.m., the airscrew being direct-driven. The cylinders have steel barrels on which the duralumin heads are screwed and shrunk, the valve seats being of bronze. The cylinders are each secured to the crankcase by four clamp fittings, these engaging with a circular flange turned on the bottom of the barrel. The two vertical valves in each head are located on the fore-and-aft centre and are operated by duralumin rocker arms, these being fitted at the ends of a common spindle which is fixed in a duralumin bracket, this, in turn, being bolted to the head. The rocker spindles are lubricated by spring greasers, these being filled by a Tecalemit grease gun. The crankshaft is carried in five plain bearings, the housings

being fixed to the top half, the lower portion forming an oil base holding sufficient oil for a flight 10 hours' duration. The connecting rods are duralumin.

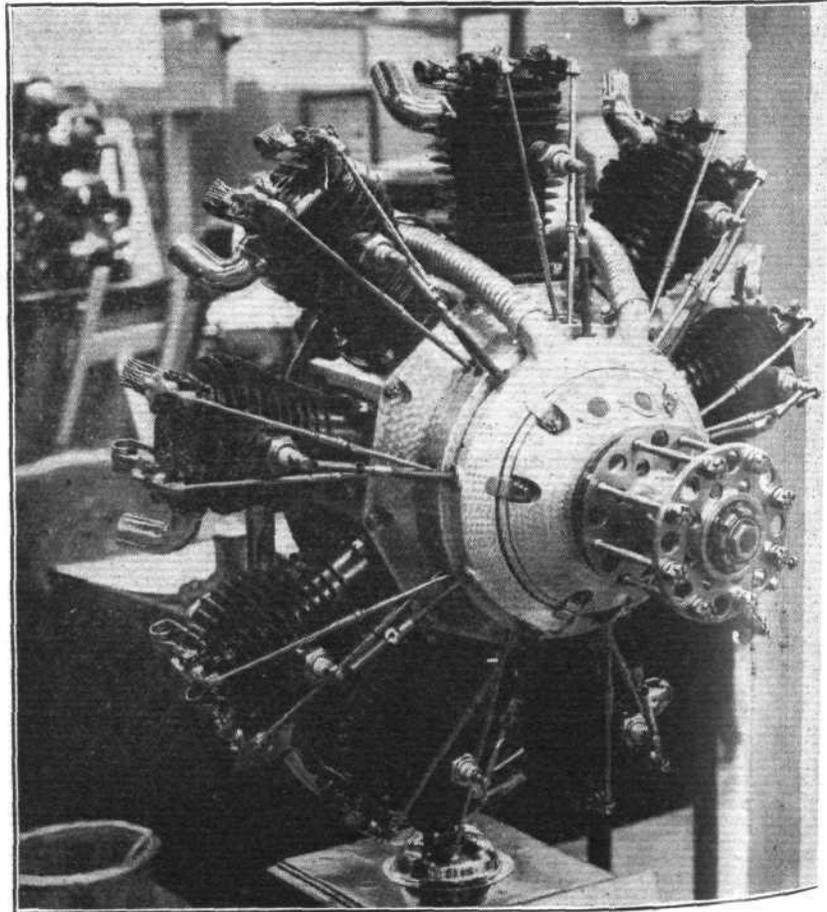
The induction pipe from the Zenith carburettor is exhaust-jacketed, the air intake also being exhaust heated. Two Ducillier magnetos driven by a cross shaft at the rear of the crankcase.

Lubrication is on the wet sump principle, the pumps being of the gear-type; the distribution oil pipes are fitted within the crankcase.

In the water-cooled engines there is little interest, the four representing two classes on the 570-h.p. type 12 K.h., and the 550-h.p. type 12 K.g. being respectively the geared and ungeared versions of the 134 mm. bore and 180 mm. stroke series, whilst the other class (125 mm. bore and 170 mm. stroke) have normal powers of 500 h.p. and 450 h.p. in the geared and ungeared types respectively, these being designated the 12 Jb. type and the 12 Ja. type. The speed, power and other particulars of these engines will be found in the Table. In each case the cylinder construction is of the separate unit type, with a common valve gear housing fitted to the heads, whilst the Zenith carburettors are mounted on the outer side of the cylinder banks. Four camshaft-operated valves are provided in each head, these being totally enclosed. The auxiliary drives are arranged in the conventional manner at the rear of the crankcase. An interesting feature is that all the engines are provided with centrifugal oil purifiers. The crankshafts and big-end bearings are of the plain-bushed type. The weights of these engines are 1,165 lbs., 1,040 lbs., 890 lbs., and 815 lbs., in order of power.

#### SALMSON

Six of the well-known air-cooled Salmson radial engines being shown on the stand of the combined French exhibit, which three are nine-cylinder types, one is a startling "dup nine," one five-cylinder and one seven-cylinder engine completing the exhibit. All are direct-driven, normal



The Salmson type AD 9-cylinder radial develops 40 b.h.p.