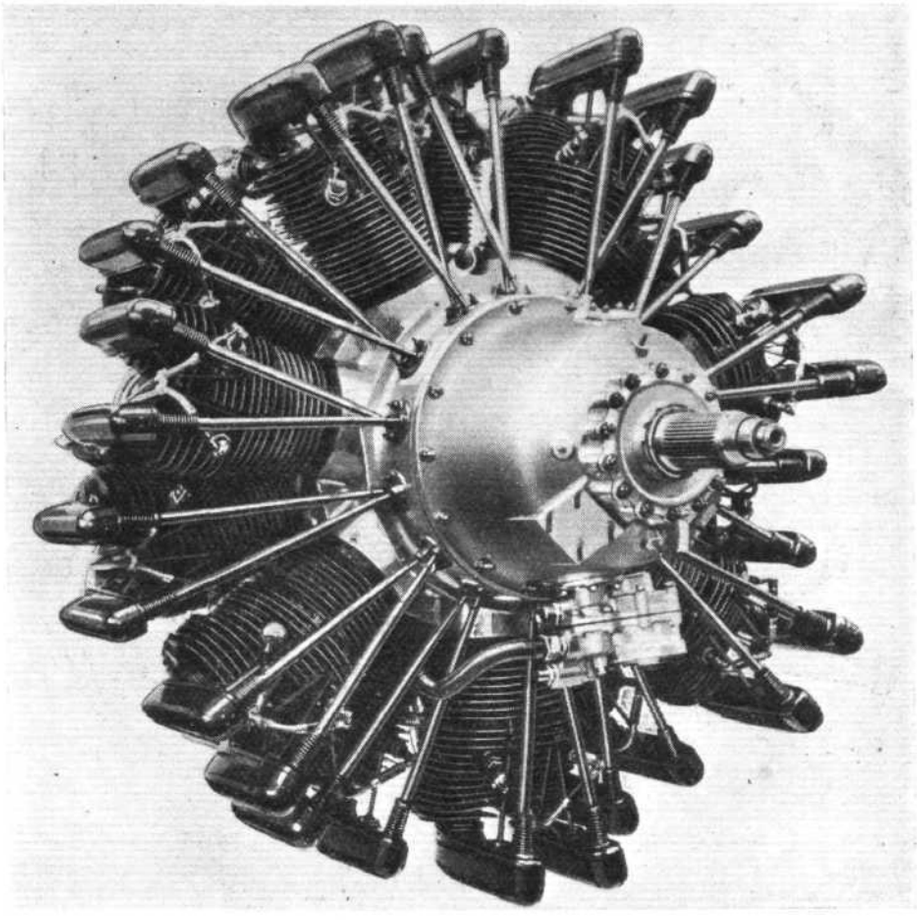
ARMSTRONG-SIDDELEY JAGUAR MAJOR

New Geared Engine



THE Jaguar Major is the name applied to the latest engine to be produced by the Armstrong-Siddeley factory at Coventry. As its title suggests, the new engine is a natural development of the famous Jaguar, its special claim to attention being the fact that although its over-all diameter is approximately the same as that of the Jaguar, its power output is considerably more. This increase of power has been attained by increasing the bore from 5 in. (127 mm.) to 5·25 in. (133·3 mm),. with a result that the cubic capacity has gone up from 1,513 cu. in. (24·80 litres) to 1,667 cu. in. (27·31 litres).

In the production of this engine two courses were open to the designers. One was to produce an engine of the same power as the Jaguar, but to save as much weight as was possible. The other was to take the Jaguar as a guide and without increasing the weight to produce a more powerful model. The Armstrong-Siddeley engineers chose the latter course, and the fact that the Jaguar Major weighs so little more than the Jaguar indicates how well they succeeded in their task.

The new engine is made with a reduction gear which is very similar to that used on the Jaguar, and can be obtained either with a geared fan or supercharger. With the former its performance is more than 10 per cent. better than that of the standard Jaguar, owing to the slight supercharging effect of the fan. The engine in this form is declared at 525 h.p. at 3,000 ft., although it is possible to run it at full throttle on the ground for short periods when it develops 600 h.p. at 2,200 r.p.m. The supercharged edition is declared at 500 h.p. at 11,500 ft.

As will be seen from the illustrated description which follows, the general design of the engine closely follows the well-proved Armstrong-Siddeley standard practice. It will be noted, however, that here and there small modifications have been introduced where deemed desirable, among which may be mentioned the incorporation of the rear cover with the engine bearer flange. It will also be seen that the rear of the engine has been arranged to take either a hand, inertia or gas starter, and that provision has been made for dealing with a two-gun gear, dynamo drive, a spare drive and an auxiliary gear pump for the rotor drive.

The accompanying series of illustrations shows the general arrangement of the engine.

Take the crank-case first (Fig. 1). It will be seen that the front of it accommodates the housing for the front main bearing and the rear is open to accommodate the diaphragm plate. The mouths into which the cylinders fit are well webbed and accommodate the adaptors, which are threaded to take the cylinders. Fig. 2 shows the complete master rod and cap half and the way in which the auxiliary rods are located in them by anchor pins. The master rod and cap half are held together by bolts, which also position the grooved anchor pins and thus encircle the crankshaft big end bearing. The crankshaft itself is shown in Fig. 3, one master rod and six auxiliary rods being located on each throw. The same illustration shows the phosphor-bronze balance weights, (which are bolted and riveted to the webs), the front and rear bearings, the timing gear drive and the splines for the internal gear.

As already mentioned, the rear of the crankcase is sealed by the diaphragm plate, the details of which differ slightly according to whether the engine is to be of the supercharged or geared-fan type. Fig. 4 shows the diaphragm plate for the supercharged engine, while Figs. 5 and 6 are two views of the front of the induction case, behind which is found the supercharger. On p. 272 the diaphragm plate for the geared-fan type of engine is shown in position in Fig. 7, and the front and rear of the induction case for the geared fan are shown in 8 and 9. The method of driving the supercharger and geared fan is, therefore, easily followed by referring to these illustrations. In both cases a gear on the rear end of the crankshaft drives the small auxiliary idler shaft gear. In the case of the supercharger there is a coupling sleeve which transmits the drive from the gear on the rear end of the crankshaft to the supercharger main driving gear, which is located on the back gear plate on the front of the induction case. The supercharger main driving gear meshes with the three big satellite gears and transmits the power through slipping clutches and through three more gears to a gear which forms part of the rotor spindle.

In the case of the geared-fan type there are two gears mounted side by side on the rear end of the crankshaft. The front or larger gear drives the auxiliary idler gear. The rear or smaller one meshes with the smaller gear of the intermediate fan gear assembly. The latter incorporates a slipping clutch, and its larger gear wheel drives a gear mounted on the end of the fan-shaft, the fan, like the supercharger, being contained in the induction case, which in both models is finally sealed by the induction casing rear cover, the latter being formed with a number of faces to which the carburettor mixture pipe, magnetos, and auxiliary drive units can be attached.

The mixture enters the centre of the induction casing cover through a fixed guide vane, and is then thoroughly atomised and distributed outwards by the fan or rotor to the seven Y-shaped induction pipes, each horn of the "Y" fitting one inlet port of the cylinders. A feature of the induction system is that part of the mixing chamber between the carburettor and the induction case is jacketed by oil, the mixture cooling the oil and the oil heating the mixture to their mutual advantage.

Turning now to the front of the engine, one finds that the space between the front wall of the crankcase and the intermediate bearing housing is occupied by the cam drum, cam-gear carrier, oil-pump driving bevel, and tappets (Figs. 13 and 14). The intermediate bearing housing (Fig. 14) encloses this mechanism besides forming a housing for the intermediate bearing. The forward end of the crankshaft