THE B.M.W. 801A

Details of Germany's Latest Twin-row Radial Power Plant

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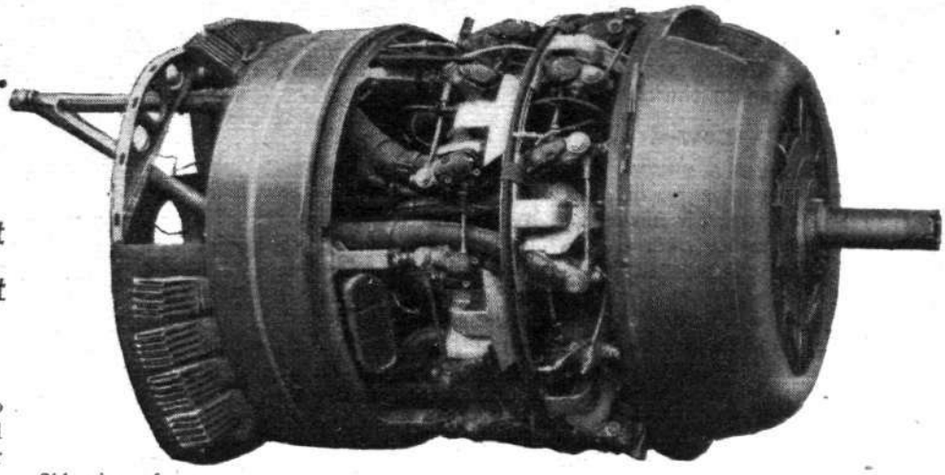


Side view of a complete unit taken from a Dornier 217 bomber. One of the blower intakes is on the lower left. The internal air scoop is attached to the cowling. A panel removed from the nose gives access to the magneto.

B.M.W. 801A

Type	14-cylinder, twin row, radial.
Bore and Stroke	6.15in. × 6.15in.
Swept capacity	42 litres.
Overall dimensions	52in. dia. × 58in. long.
Rated Output	1,460 b.h.p. at 16,300ft.
Take-off power	1,580 b.h.p. for 3 min.

IT would be somewhat misleading to refer to the power unit employed on the Focke-Wulf 190 and Dornier 217 machines merely as the B.M.W. engine. In the fullest sense it is a complete power plant, conceived and constructed as a compact whole. Here is no question of an engine fitted with a number of auxiliaries and enclosed by a cowling whilst coolers and air scoops are added externally. The idea may not be novel in conception, but the practice is new in production and of outstanding interest.

Using the fourteen-cylinder air-cooled twin-row radial B.M.W. engine as a basis, the aim was to obtain the maximum power output whilst reducing overall dimensions and frontal area to a minimum and presenting an aerodynamically smooth exterior. Everything is subordinated to this end.

Many ingenious constructional features are employed, and the practical result must be regarded as a justification of the design. Within a cowling of 52in. diameter and having an overall length of 58in. is packed a remarkable power output. The rating under various conditions is as follows:—

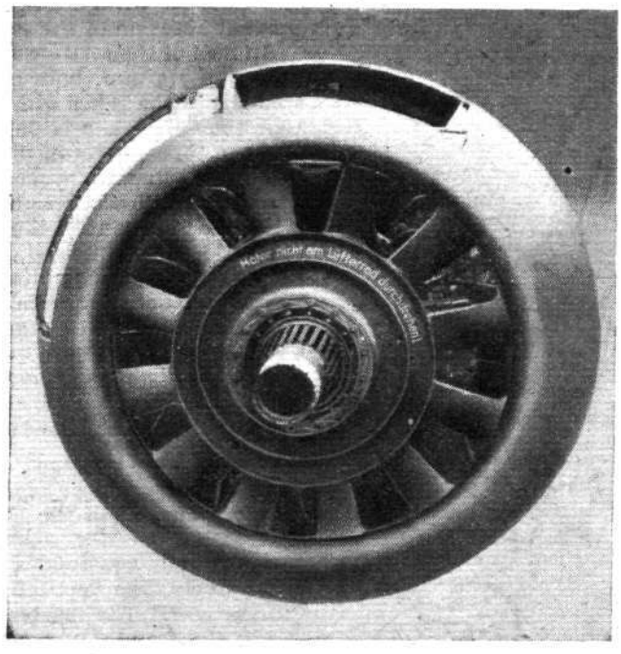
	Boost	r.p.m.	b.h.p.	Altitude
Take off	1.32 atm.	2,700	1,580	
Emergency maximum	1.3 ,,	2,550	1,585	15,750ft.
International rating	1.27 ,,	2,400	1,460	16,300ft.
Continuous maximum	1.15 ,,	2,300	1,280	18,500ft.
Economical cruising	1.1 ,,	2,100	1,125	19,500ft.

To achieve the low overall diameter the cowling closely encircles the 50in. diameter engine and is supported by front and rear rings and an inter-cylinder baffle ring, all attached to the valve rocker boxes by rubber-bushed bolts. Special measures are taken both to introduce the requisite amount of air and to ensure its distribution throughout the interior.

Cooling Fan

At the front end the cowling is faired down to shroud a twelve-bladed magnesium alloy fan of 32in. diameter. The fan is driven from the airscrew reduction gear at 1.72 times crankshaft speed, which is equivalent to 3.17 times the airscrew speed. An adequate air flow is thus assured when the engine is running on the ground or in flight at low speeds.

Of course, considerable power is required to drive a fan of this size, and it is estimated that 100 h.p. is needed for this purpose at the take-off. When the aircraft has a forward speed of 170 miles per hour, however, the fan is motored round by the air stream, and no power is absorbed directly. The loss of 100 h.p. of the critical take-off output must be reckoned a disadvantage, but this is offset by the advantages in flight conferred by a positive cooling air flow and by the small diameter low-drag cowling. It is an indication of how the unit is considered as a whole.



Front view showing the fan which is driven at 1.72 times crankshaft speed. It supplies all air for the engine, cylinder cooling, oil cooling, and cabin and wing heating.

Exit of air from the interior of the cowling is by way of two circumferential slots controlled by sliding gill rings, as indicated in the diagram of the airflow system. Each of these gill rings is actuated by an electric jack and a push-pull cable. A series of bell crank levers spaced around the diameter of the support member and coupled to the gill ring and an equaliser ring ensure axial movement, giving a uniform annular slot. The rear ring, controlling the airflow past the cylinders, has two positions only, with an axial movement of 3.12in. Maximum and minimum discharge areas, after deducting the cross-sectional area of the exhaust pipes which project through this slot, are 3.7 sq. ft. and 1.2 sq. ft. respectively. The forward ring, sealed to the shrouding of the cooling fan by a flexible rubber joint, is variable throughout its permissible axial movement of 1.12in. to control the reverse flow of air from the interior of the cowling through the oil coolers. This slot has a maximum area of 0.73 sq. ft.

Internal Air Scoops

The air intake for the supercharger is also completely inside the cowling, and fed from the air delivered by the fan. Two shallow segmental scoops are fitted inside detachable sections of the cowling on each side of the engine. It is, of course, not practical to make a normal bolted connection, and actually the junction is effected by the flange of the