AERO ENGINE SCHOOL
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AVON 200 SERIES

AIR COOLING AND SEALING.

General Description.

Air is taken from tappings in the compressor assembly to pressurize the bearing oil seals and to reduce the working temperature of some of the engine components.

5th stage air is used to assist sealing of the three main bearings by pressurizing the oil seals, also to cool the rear bearing.

15th stage air is used to cool the H.P. and L.P. turbine discs, H.P. N.G.V's. and H.P. turbine blades.

Flow Details.

5th Stage.

Air is taken from the 5th stage through a vortex reducer which removes the whirl before passing the air into the hollow compressor shaft.

Holes in the front of the shaft allow air to pass out to the rear of the front bearing housing and so prevent oil leakage rearwards; it also breaks down the depression in the eye of the compressor.

Passing out through holes in the rear of the compressor shaft some of the air flows over the internal wheelcase into the intermediate casing and prevents oil loss from the centre bearing and wheelcase by pressurizing the front and rear oil seals.

The majority of the air from the compressor shaft flows directly into the hollow turbine shaft and emerges between this and the rear bearing sleeve to cool the bearing inner track.

After pressurizing the rear bearing oil seals, the air passes through eight radial spokes into a manifold around the nozzle box, for cooling and finally vents to atmosphere.

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15th Stage.

High pressure air from the 15th stage passes between the inner heat shield and the intermediate casing, flows rearwards through six or ten* transfer tubes (according to Mk. of engine) on to the front face of the H.P. turbine disc where the flow divides. * 6 on 203

Some air flows outwards, past a controlling seal, and pressurizes the clearance gap at the front of the H.P. turbine blade roots to prevent an inward flow of hot gas. Air also flows through drillings at the periphery of the disc, through the hollow turbine blades, and exhausts into the gas stream, so cooling the blades.

An inward flow of air passes via holes in the front of the H.P. disc hub to the space between the two discs where it again flows outwards to the blade root gaps. An interstage seal proportions this flow between the rear of the H.P. blade roots and the front of the L.P. roots.

The gap at the rear of the L.P. blade roots is pressurized by air from the hollow turbine bolt, controlled by a calibrated orifice at the centre of the L.P. disc.

High pressure air also passes through the hollow H.P. N.G.V's. and is vented through drillings on the trailing edge into the gas stream.

15th Stage Compressor Vent.

To prevent a build-up of pressure on the rear of the 15th stage disc so relieving the load on the centre bearing.