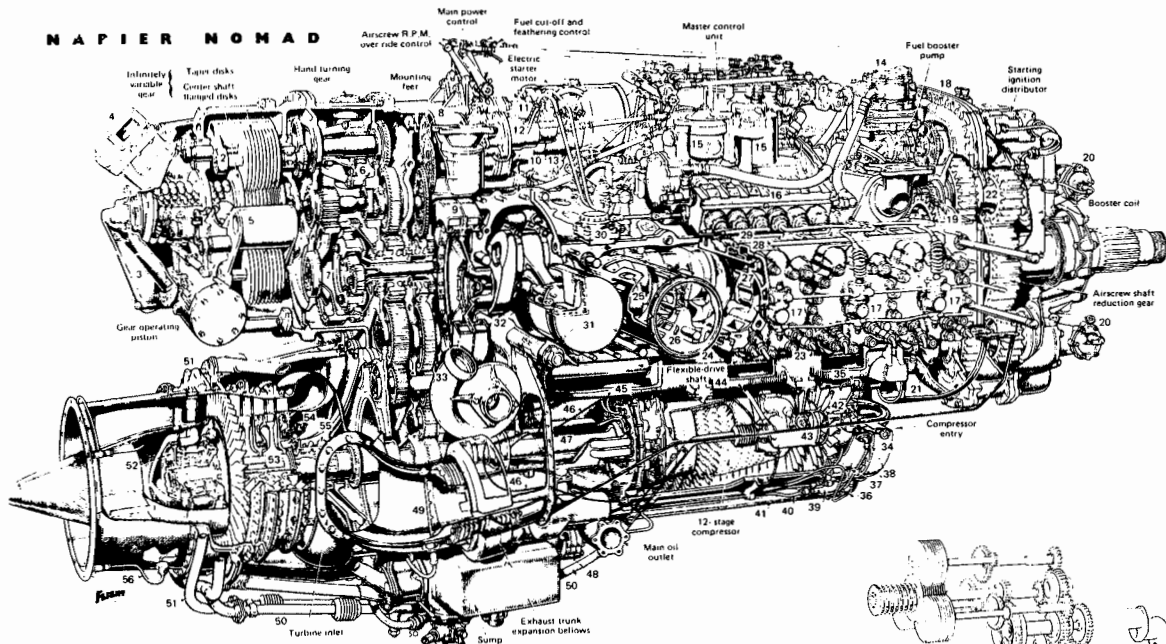
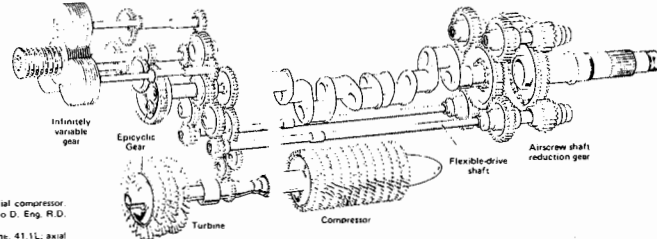


NAPIER NOMAD



- Variable Gear
 - 1 Disk-loading spring.
 - 2 Swinging shaft.
 - 3 Oil-pressure lead gallery to center-shaft disk.
 - 4 Gearbox breather, with matrix separating oil from air.
 - 5 Gear ratio indicator.
- Wheels
 - 6 Hand-turning gear.
 - 7 Epicyclic reduction gear.
 - 8 Turbine governor and tachometer drives.
 - 9 Viscous crankshaft damper.
- Top Cover
 - 10 Fuel-pump cross shaft.
 - 11 Turbine over-speed governor.
 - 12 Turbine tachometer generator.
 - 13 Crankshaft tachometer generator.
- Fuel System
 - 14 De-aerator.
 - 15 Filters (4).
 - 16 Injection pumps (2).
 - 17 Injectors (12).
- Front Casing
 - 18 Booster-pump drive.
 - 19 Injection-pump drive take-off.
 - 20 Torquemeters.
 - 21 Flexible-shaft front coupling.
 - 22 Layshaft reduction gear.
- Cylinder Block
 - 23 Igniter plugs.
 - 24 Dry liner.
 - 25 Induction ports.
 - 26 Exhaust ports.
- 27 Induction-port deflectors.
- 28 Coolant distribution gallery.
- 29 Coolant return to outlet.
- 30 Coolant outlet.
- 31 Hot-crown piston.
- 32 Induction trunk.
- 33 Coolant pump, delivery to block.
- Compressor
 - 34 Entry annulus, with struts and bullet devices by 12th-stage air.
 - 35 Air inlet pressure.
 - 36 Air static pressure.
 - 37 Air temperature.
 - 38 Oil to front bearing.
 - 39 Sump.
 - 40 Oil return to scavenge pump.
 - 41 12th-stage supply to device intake.
 - 42 Variable incidence intake vanes.
 - 43 Filter of 4th-stage air to turbine and compressor bearings.
 - 44 Air to cool compressor bearings.
 - 45 Oil to rear bearing.
 - 46 Bifurcated delivery trunk.
 - 47 Coupling shaft to turbine.
 - 48 Compressor-oil scavenge pump.
- Turbine
 - 49 Exhaust-pipe pressure.
 - 50 4th-stage compressor air to front and rear bearing.
 - 51 12th-stage air to thrust-balance piston.
 - 52 Thrust-balance piston.
 - 53 12th-stage disk-cooling air.
 - 54 Labyrinth seal pressurized by 12th-stage air.
 - 55 Circulation space for 4th-stage bearing-cooling air.
 - 56 Tail-pipe pressure.



This special "flight" copyright drawing displays almost the whole of the internal layout of Napier's diesel compound. On the right is shown the arrangement of the gears for the airscrew shafts and the drive from the turbine, the latter feeding in its power through an infinitely variable ratio drive and an epicyclic reduction gear.

PRINCIPAL DATA

Twelve-cylinder, two-stroke valveless diesel engine compounded with three-stage turbine driving both crankshaft and axial compressor. Specified fuels: diesel pool gas oil, wide-cut petrol (D. Eng. R.D. 2486), or kerosine (D. Eng. R.D. 2487); lubricating oil to D. Eng. R.D. 2472/2.

Overall length, 40 in.; overall width, 56 1/4 in.; overall height, 119 in.; cylinder bore, 6 in.; stroke, 7 3/8 in.; swept volume, 41.1 L; axial compressor, 12 stages with mass flow of 13 lb/sec. and pressure ratio of 8.25:1; boost pressure, 89 lb/in. absolute; brake mean effective pressure, 205 lb/in. sq.; overall expansion ratio, 26:1; airscrew reduction gear ratio, 0.526, 0.555, 0.569, 0.614 or 0.660 to 1; airscrew type: Rotol (solid light-alloy blades) or de Havilland (hollow-steel blades) in sizes from 13 ft to 16 ft diameter; dry weight, 3,580 lb. Note: The performances given refer to full power at sea level.

The principal features of the Nomad's performance are given in the power and s.f.c. curves on page 551: actual points from these curves are: sea level take-off (crankshaft 2,050 rpm, turbine 18,200 rpm) 3,046 shp at 0.355 lb/hp/shp, or 3,135 shp (allowing for 320 lb thrust) at 0.345 lb/hp/shp; operational necessary at 11,000 ft, in ICAE atmosphere at 300 knots TAS (crankshaft, 2,050 rpm, turbine 19,600 rpm), 3,110 shp at 0.346 lb/hp/shp or 3,250 shp at 0.333 lb/hp/shp; cruising at 25,000 ft under same conditions (crankshaft 1,750 rpm, turbine 19,600 rpm), 1,852 shp at 0.340 lb/hp/shp or 2,024 shp at 0.327 lb/hp/shp.

FIG. 11-12 Napier Nomad. The reader may consider this a complex engine, but Napier did not; for example, it described the flat-twelve two-stroke Diesel that formed its reciprocating component as "the simplest possible type." (Courtesy of Flight via NASM-Smithsonian.)