

Exhaust Tract for Combustion Engines – Turbocharger

Field of Application

Turbocharged engines have significant advantages over aspirating engines with a comparable cylinder capacity. The novel MEDUSA (Multiple exhaust duct with source adjustment) technology increases the efficiency of Diesel as well as gasoline engines. As a cost-saving alternative to conventional processes it is of great interest to automobile manufacturers.

State of the Art

Established processes for the gas flow onto the turbine wheel of a turbocharger all collect exhaust gases from each cylinder in a manifold which subsequently flow onto the rotor via a volute housing. Current approaches include the joining of certain exhaust channels to allow the application of the impulse energy from separate channels onto the turbine wheel (Twin-Scroll-Turbine). All the regulatory functions (such as VTG and waste gate) to control the flow onto the rotor are built into the body of the turbocharger because the flow is uniformly distributed over the periphery of the rotor wheel.

Innovation

In the present invention the exhaust gas from each cylinder is completely separated with regard to the exhaust gas guidance and application onto the turbine wheel. Thus the partial application of gases from each single cylinder onto the rotor becomes possible. Several channels belong to each cylinder as will now be briefly explained by an example, namely a two cylinder engine. Six inflow channels are distributed around the circumference of the rotor wheel for regulation, three for each of the two cylinders (C1 and C2). These channels are controlled separately according to the exhaust volume flow, whereby each channel applies its exhaust gas to a defined segment of the rotor. A further channel for each cylinder can serve as a bypass (1d, 2d) (see Figure 2).

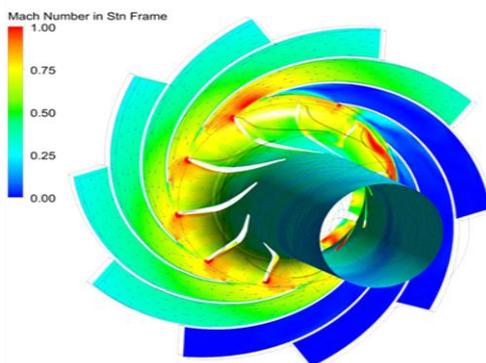


Figure 1: Heat distribution on the turbine

Advantages

- ✓ Optimal flow application onto the turbine, particularly at low rotational speeds
- ✓ Fast response characteristics
- ✓ Absence of turbo lag
- ✓ Very durable, particularly at high combustion temperatures
- ✓ Simpler and less expensive to manufacture than VNT and VGT
- ✓ Turbocharging for gasoline engines

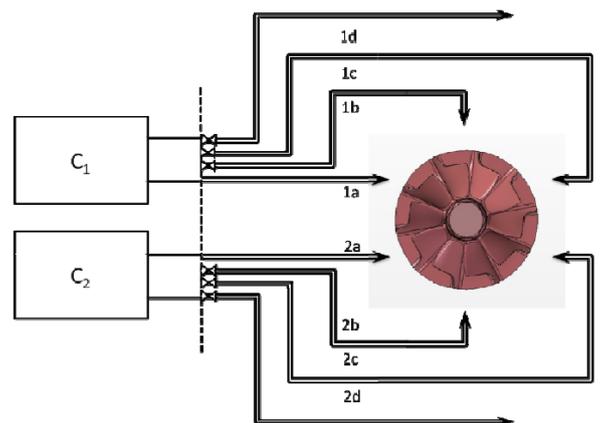


Figure 2: Principle of the invention demonstrated for a two cylinder engine.

Technology Transfer

The Technologie-Lizenz-Büro GmbH is responsible for the commercialization of this technology and is now offering suitable enterprises licenses for the use of this technology. A prototype is available.

Patent Portfolio

Patents granted in USA (US9267418 B2), Europe (EP2647808 B1), Japan (JP6213788 B2) and China (CN104334853 B). An application in Korea is pending.

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