Piston Displacement Increase by an Inline Twin-Piston Engine

General

Internationally, the development stage of present four-stroke internal combustion engines has achieved a very high degree of quality. There are only few starting points for improving certain performance parameters of such a machine in terms of construction or to increase their performance. A possible starting point is provided by the Carnot cycle – the theoretical basis for all periodically working heat engines.

Prior Art

In a four-stroke internal combustion engine the cycle operates according to the known four strokes. Due to the constant surface area of the working piston and the requisite opening of the exhaust valve prior to the lower dead centre of the piston stroke in the working cycle, exhaust gas that is still compressed leaves the cylinder space without being used for generating a torque. A way to bypass this are various methods known as turbochargers.

The invention

It is based on a detailed analysis of the Carnot cycle. Looking at a graph of the four strokes of the internal combustion engine, it can be seen that the residual volume in the combustion stroke is a starting point to increase the torque. The basis for a technical implementation can be found in the patent application ***"Inline Twin-Piston Engine"*****;** a simulation shows the graph of the pv diagram. By means of computational models it was determined that the largest increase in the efficiency of a four-stroke internal combustion engine can be achieved if the diameter ratio of the inline twin piston Da/Di is selected as 1.5.

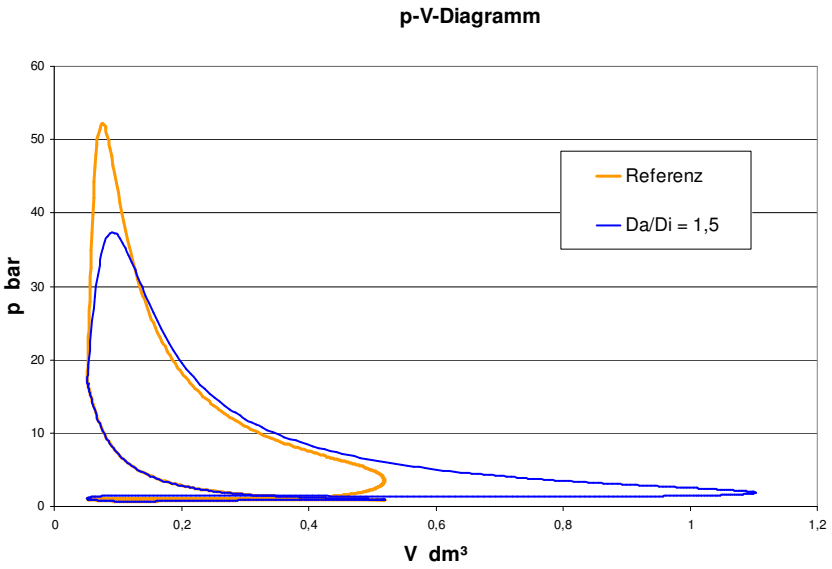
When these dimensions are selected, the results for an inline twin-piston engine can be summarized as follows:

- in comparison with conventional Otto engine the working pressure can be deemed to be at the same level,
- the peak pressure can be lowered,
- the peak temperature can be lowered slightly [about 5%],
- no increase in the friction is to be expected since only one piston wall operates at any time.

Market potential

Due to the improved utilization of the adiabatic/isothermal operation of the inline twin-piston engine, a slightly reduced CO2 emission is to be expected. On account of the advantages of the invention that have been mentioned, this type of engine can be expected to have good market opportunities even in the age of electromobility since due to the increase in the piston displacement the most important inventive result is a higher torque also in the lower speed range.

Simulation graph



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