

RPM – Rotary Piston Machines

A new class of innovative machines

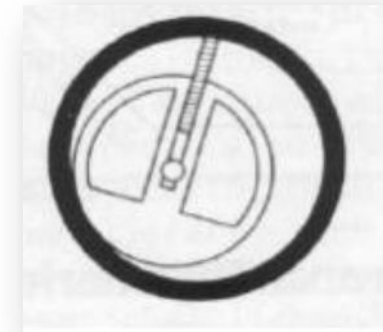
1 Historical Background



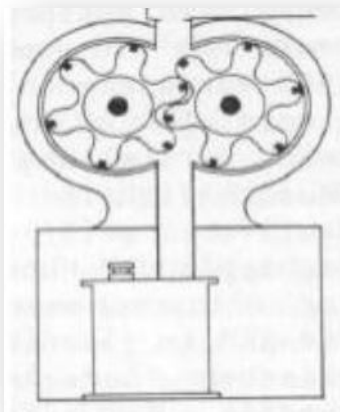
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▶ Rotary Piston Machines

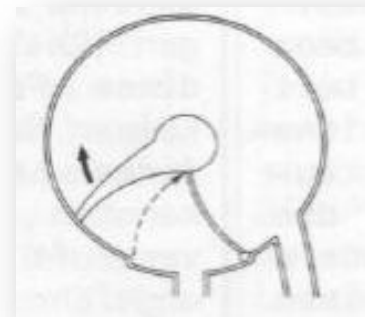
- Self-evident movement
- Inadequately sealing
- Low stability under load



1588 RAMELLI



1799 MURDOCK



1782 JAMES WATT

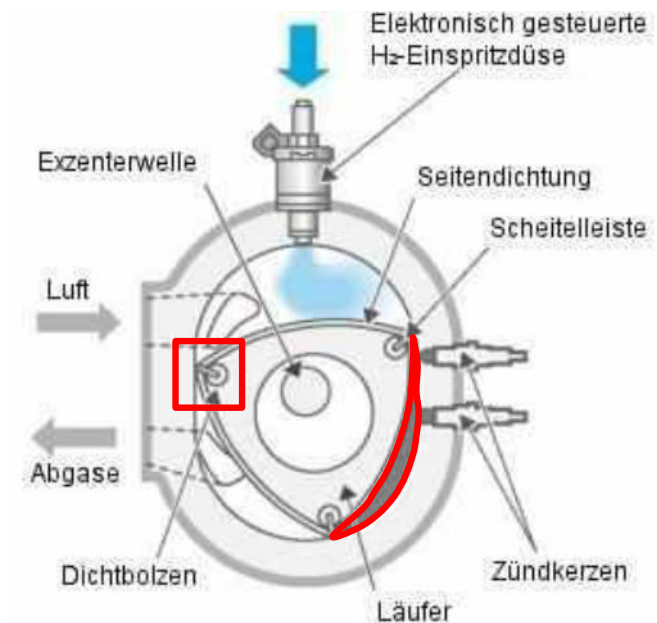
1 Historical Background

► Felix Wankel (*1902 †1988)

- In 1929 he patented his first rotary piston engine
- Sealing techniques studied for years
- 1934 collaboration with BMW
- 1951 collaboration with NSU
- 1963 first prototype of Toyo Kogyo (Mazda)



- First mass-production vehicle Wankel-Spider
- End of era with the RX-8



2 Advantages of Rotary Piston Machines



- ▶ Smooth-running behaviour
 - Mode of operation
 - Movement of the individual components
 - Less vibration

- ▶ Fewer moving parts
 - Renunciation of mass flywheel
 - Renunciation of the crankshaft assembly

- ▶ Cost reduction in manufacturing and maintenance area

2.1 Generic Relationship

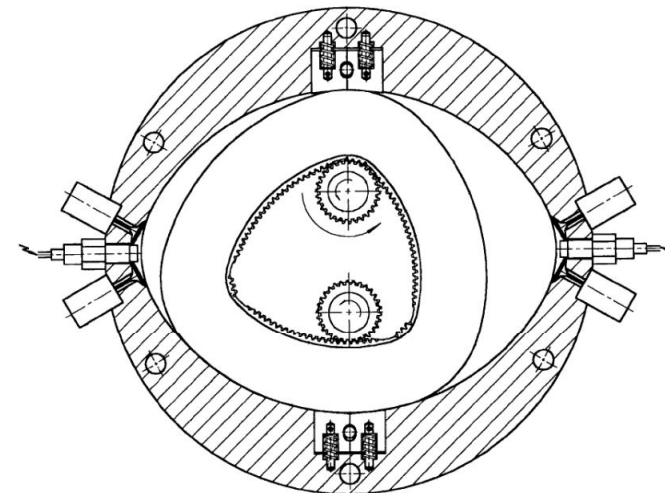


- ▶ Rotary engines are generically related to the reciprocating engines and form a topological class
- ▶ Reciprocating engines are a physical limiting case within this class of machines
- ▶ Portability of materials
fuel consumption
exhaust issues
Diesel ability
etc.

3 Presentation of this Special Machine



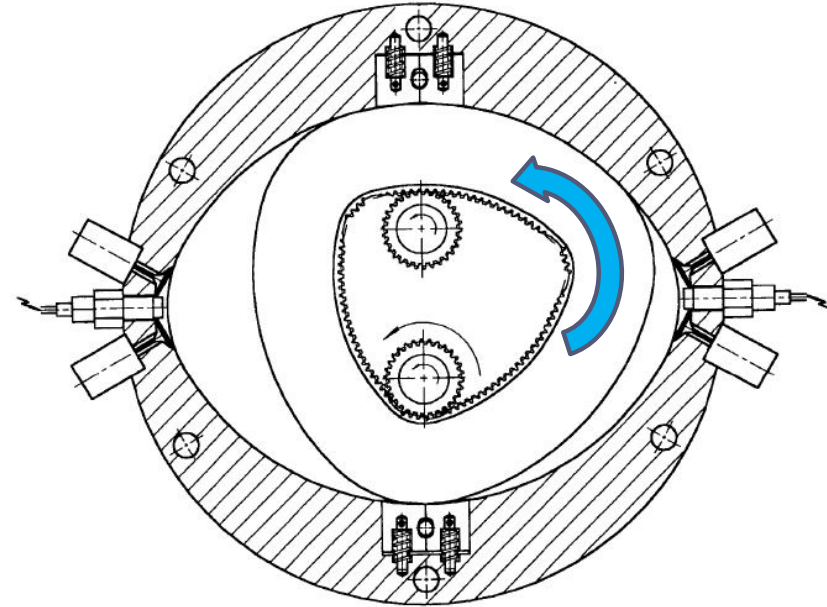
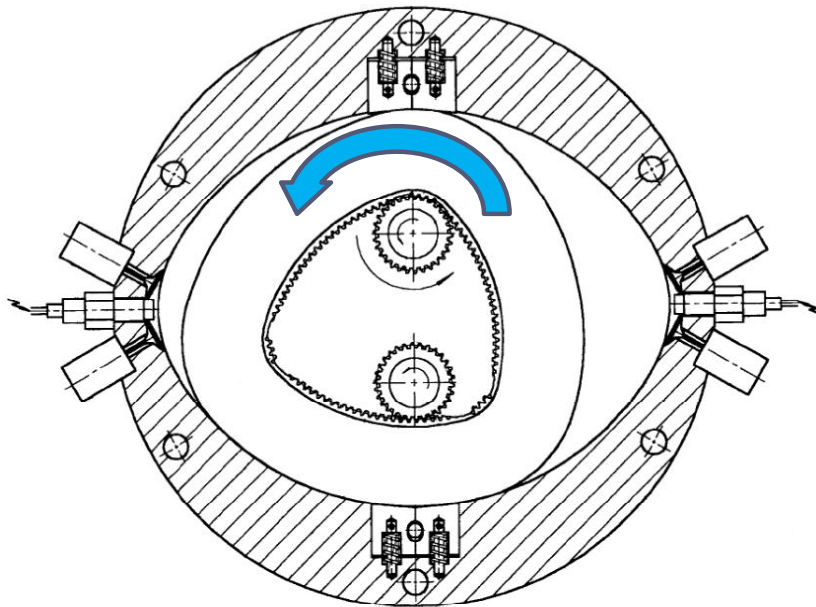
- ▶ Inventor: Dr. Boris Schapiro
- ▶ Inventions are patented
- ▶ Version of one and two axial
- ▶ Application: internal combustion engine, pumps, etc.



3.1 Mode of Operation

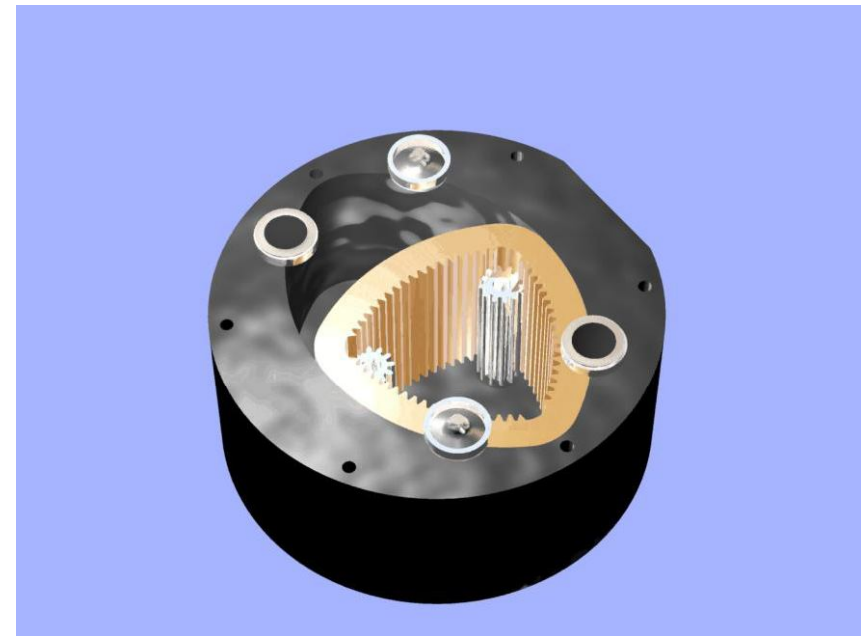
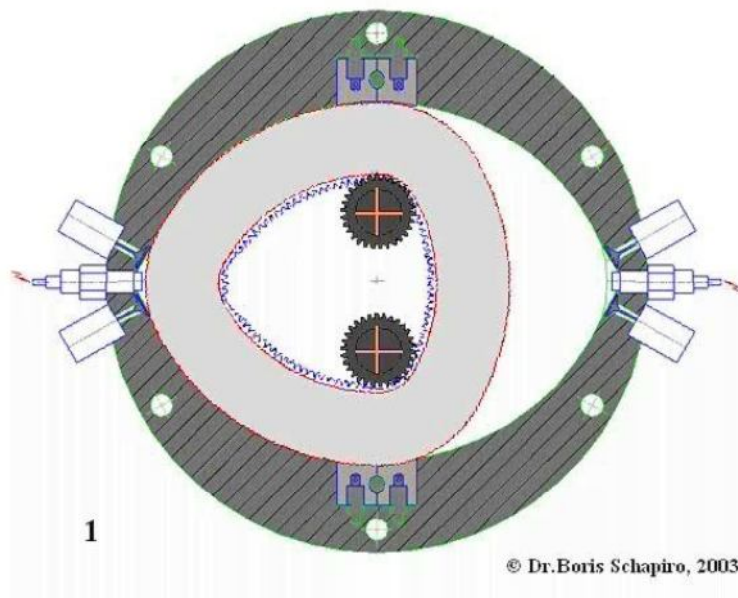


- ▶ Operating mode of this special rotary piston engine



3.1 Mode of Operation

- ▶ Simulation of the movement sequence respectively the operation as a compressor



3.2 Advantages over existing Technologies



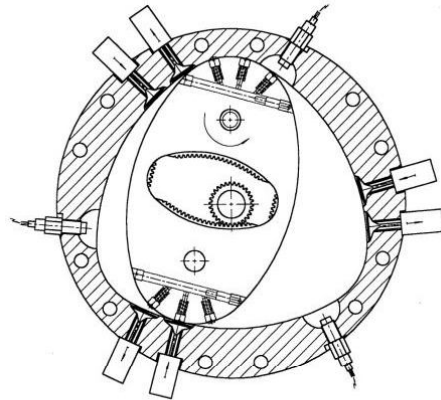
IS

- ▶ 3 - 5 times smaller dimensions
- ▶ Minimization of fixed and movable parts
- ▶ Lighter weight
- ▶ High speed transfer [1:7]

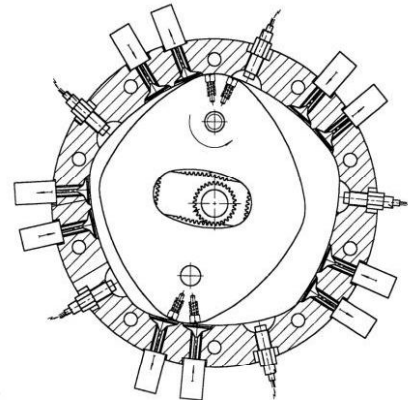
Target

- ▶ Optimization of compustion and work chamber
- ▶ Complete combustion
- ▶ Higher power density
- ▶ Reduced emission combustion process
- ▶ Diesel ability

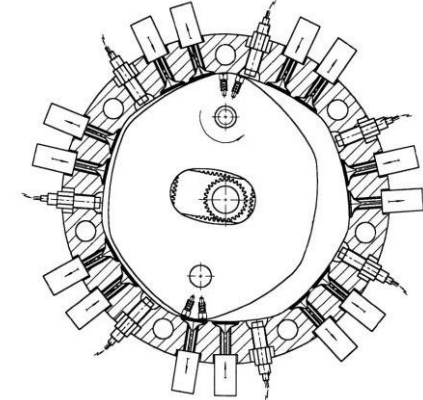
3.3 Derivatives



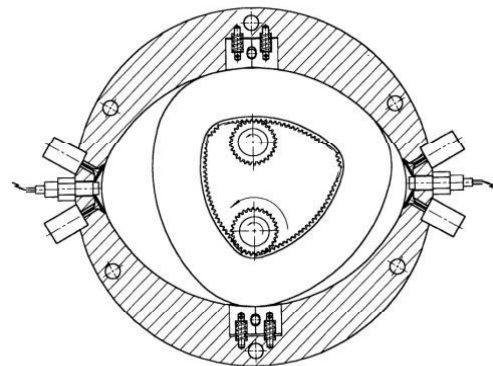
Bi-Oval



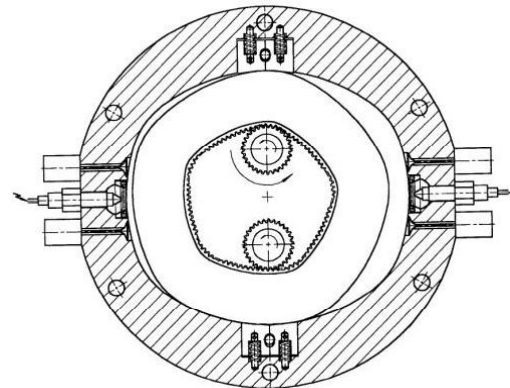
Quad-Oval



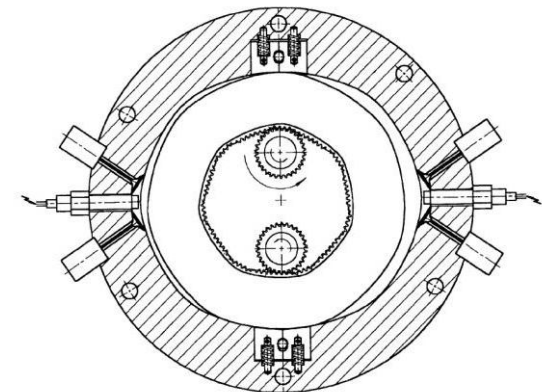
Sext-Oval



Tri-Oval



Quint-Oval



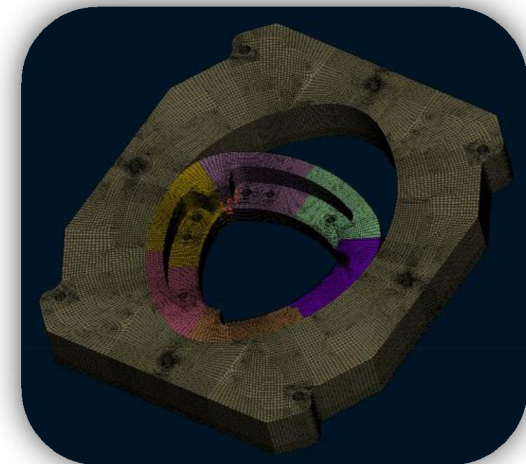
Sept-Oval

4 Technical Progress



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- ▶ Mechanical feasibility
- ▶ Simulation of
 - Movement
 - Natural harmonics
 - Thermodynamics
- ▶ Design of the
 - Internal gear
 - Internal gear box
 - Sealing



5 Application Potential I



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▶ Stationary aggregate

- Compressors
- Pumps
- Hydraulic & pneumatic drives
- Transport of media



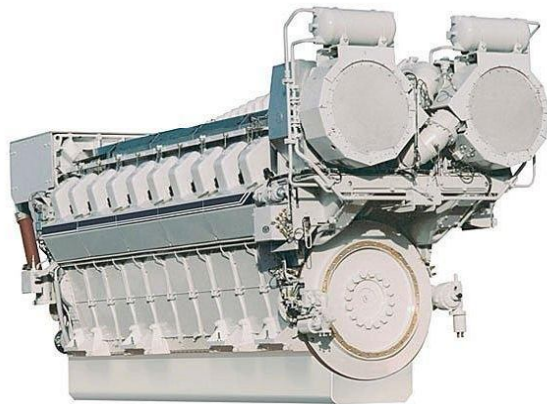
5 Application Potential II



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► Means of transport

- Passenger car
- Bus
- Truck
- Ship
- Aircraft



5 Application Potential III



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► Sustainability



- Economical and efficient machine
- Elektro mobility
- Solar power station



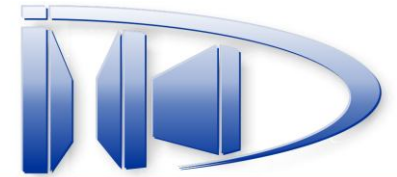
6 Further Steps and Future Prospects



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- ▶ Consistent approach with success
- ▶ Focus on internal combustion engine
- ▶ Design of the individual components
- ▶ Implementation of the machine
- ▶ IS = TARGET





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