The zero emission compressed air motor from PME

CO_2 neutral with the smallest footprint

(Patent pending)

The climate protection motor for future mobility

PME Pelz Motorenentwicklung
Daimlerweg 2
D-82538 Geretsried, Germany

office@pelz-safe.de
www.pelz-motorenentwicklung.de

Phone +49 (0) 8171/9309-10
Fax +49 (0) 8171/9309-40

Compressed air motor single-stroke

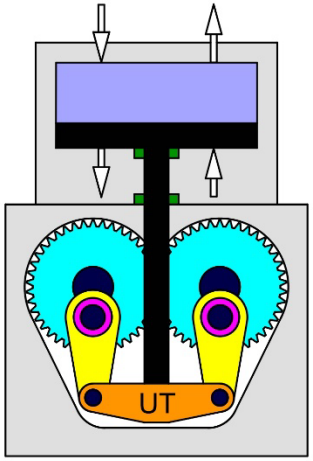

Figure 1

Test vehicle with multiple-stage compressed air motors (as of 2023)

Figure 2

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2. Features

The compressed air motor is compact, safe, and can be used anywhere

- Small number of parts ==> low production costs, long service intervals
- Outstanding safety aspect: the tank is explosion-proof and non-combustible
- Compressed air drive without oil lubrication
- Small battery for on-board electronics
- Ideal for sensitive applications (water, interior rooms, etc.)
- In principle, suitable as a pump, steam or hydraulic motor, compressor, etc.
- Smallest footprint of all drive systems

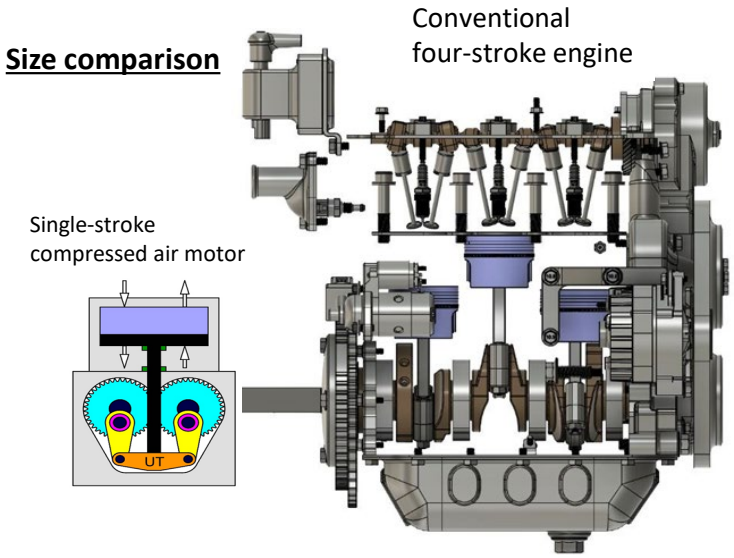

Figure 3

3. Technology

- Piston works in both directions (single-stroke, unlike conventional two-stroke and four-stroke combustion engines)
- Low-vibration motor with slow rotational speed
- Proven double crank drive or current standard solutions (Figures 4 and 7)
- Electronic control (forward/reverse/freewheel)
- Minimal friction – no transmission, reverse gear, cylinder head control unit, drive shaft, differential, alternator, oil pump, starter, etc.
- Simple solution for all-wheel drive with single axle drive (Figure 5)
- Any number of pressure chambers possible (Figures 6 and 8)

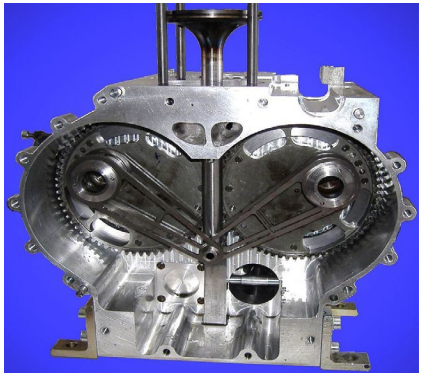

Figure 4 – Double crank drive

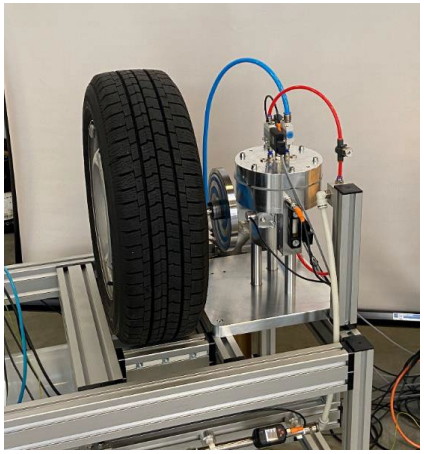

Figure 5 – Single axle drive

4. Motor and crank drive variants

Piston variant

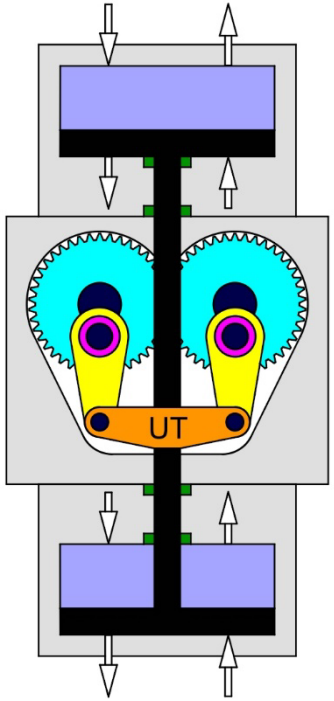

Figure 6

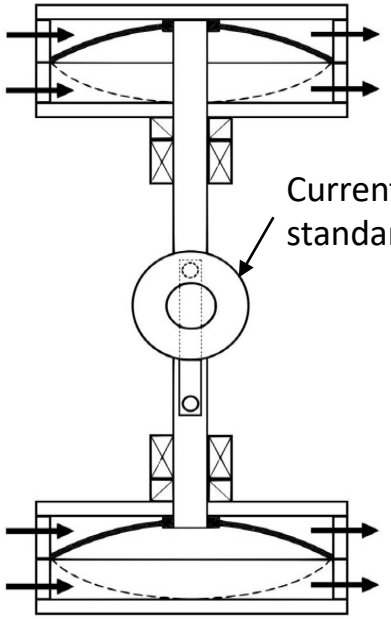

Figure 7

Multiple-stage variant

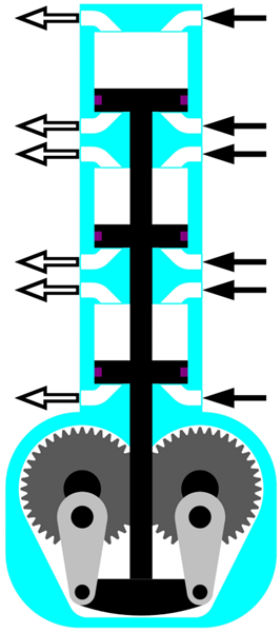

Figure 8

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5. Driving conditions and operation

- The compressed air motor only runs when propulsion is required
- Power is instantly available
- Accelerator pedal controls the pressure on the electronic valves for power demand
- No power demand => Vehicle rolls – freewheel – motor stops
- Reversing: flip switch for solenoid valve
- Downhill/rolling/braking: freewheeling is activated/deactivated or brake function (recuperation) is used.

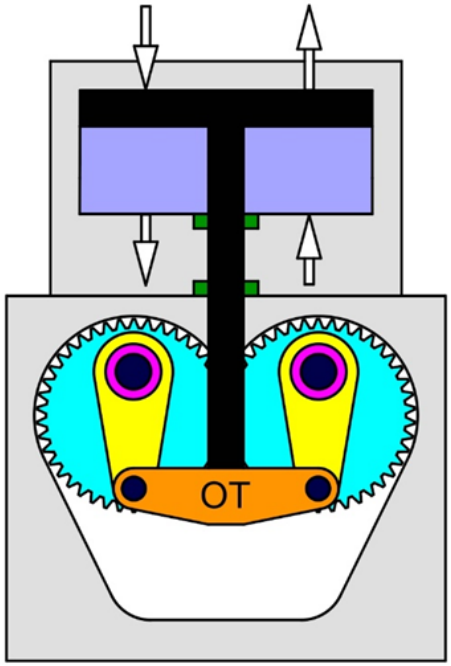

Figure 9

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6. Compressed air tank with variants

- Compressed air tanks can be positioned as desired (see Figures 12a and 12b)
- Tank is replacement for chassis/undercarriage (high torsional stiffness)
- Straightforward layout of chassis variants
  ➔Significant cost savings; see Figure 12
- Carrier for single axle drive
- Buffer zone for accidents
- Can be charged with any outlet using on-board compressor or at stationary compressed air stations within minutes

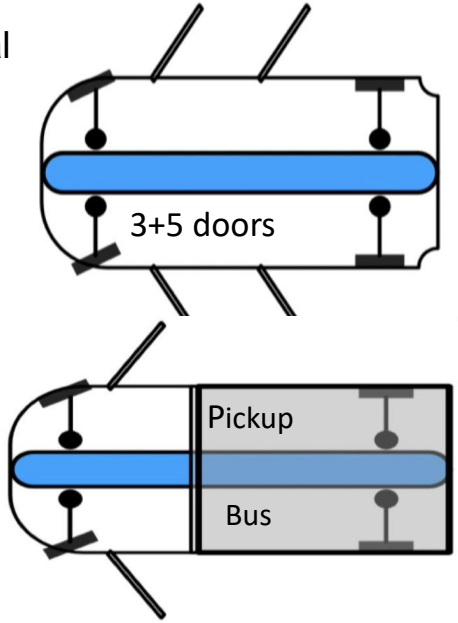

Figure 10

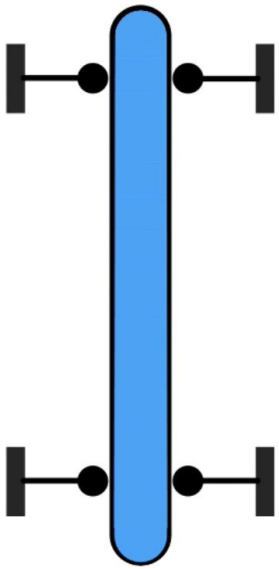

Figure 11

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7. Concept study for vehicle with compressed air motor

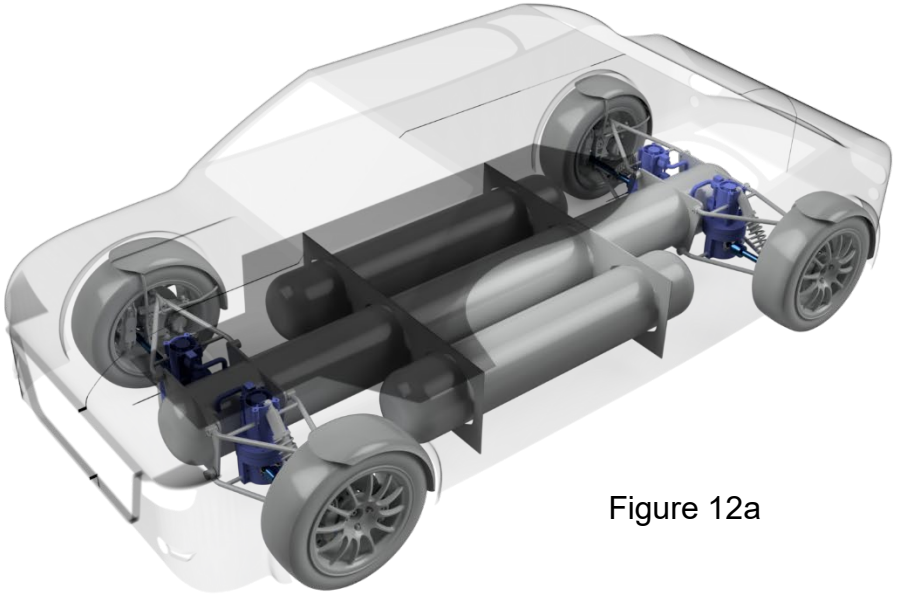

Figure 12a

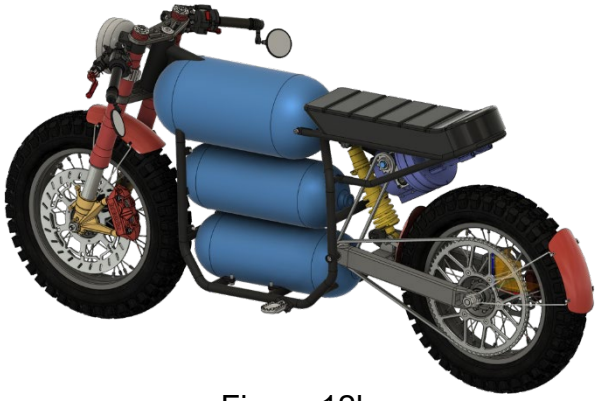

Figure 12b

- Compressed air tanks and drive system complete as undercarriage
- Variable chassis structure for passenger or goods transport
- All-wheel drive realized with 4 compressed air motors according to power demand

8. Environmental and climate aspects

- Unlimited supply of air as the working medium, no environmental exploitation of our resources (no hazardous waste, as with today's Li-ion batteries)
- Air is only compressed but not polluted => **Zero Emission**
- Exhaust air is free of harmful substances, can escape unfiltered, unaltered, and quietly
- Environmental impact:
  - No air pollution with carbon dioxide or nitrogen oxide
  - No soil contamination
  - No groundwater or wastewater contamination
  - No health impairment
- Ecological value chain of air as a fuel:
  - No extraction of raw materials, no fuel transportation or production
  - Compressor operation with renewable energy produces no CO_2
  - Straightforward recycling, no hazardous waste, no waste tourism
- Resource consumption:
  - Lowest consumption of energy, raw materials, water, rare earths, agricultural land, human and animal habitat

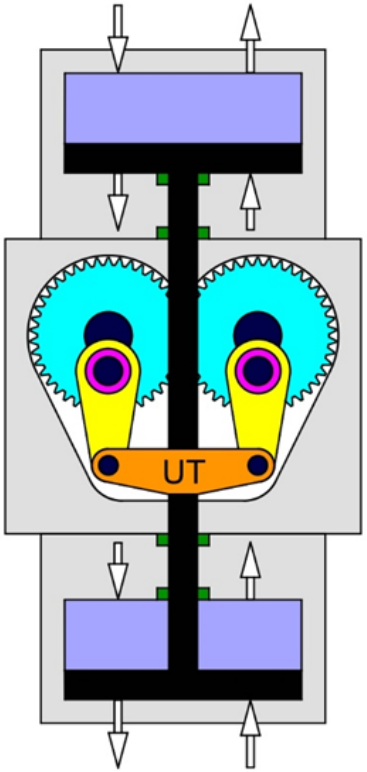

Figure 13

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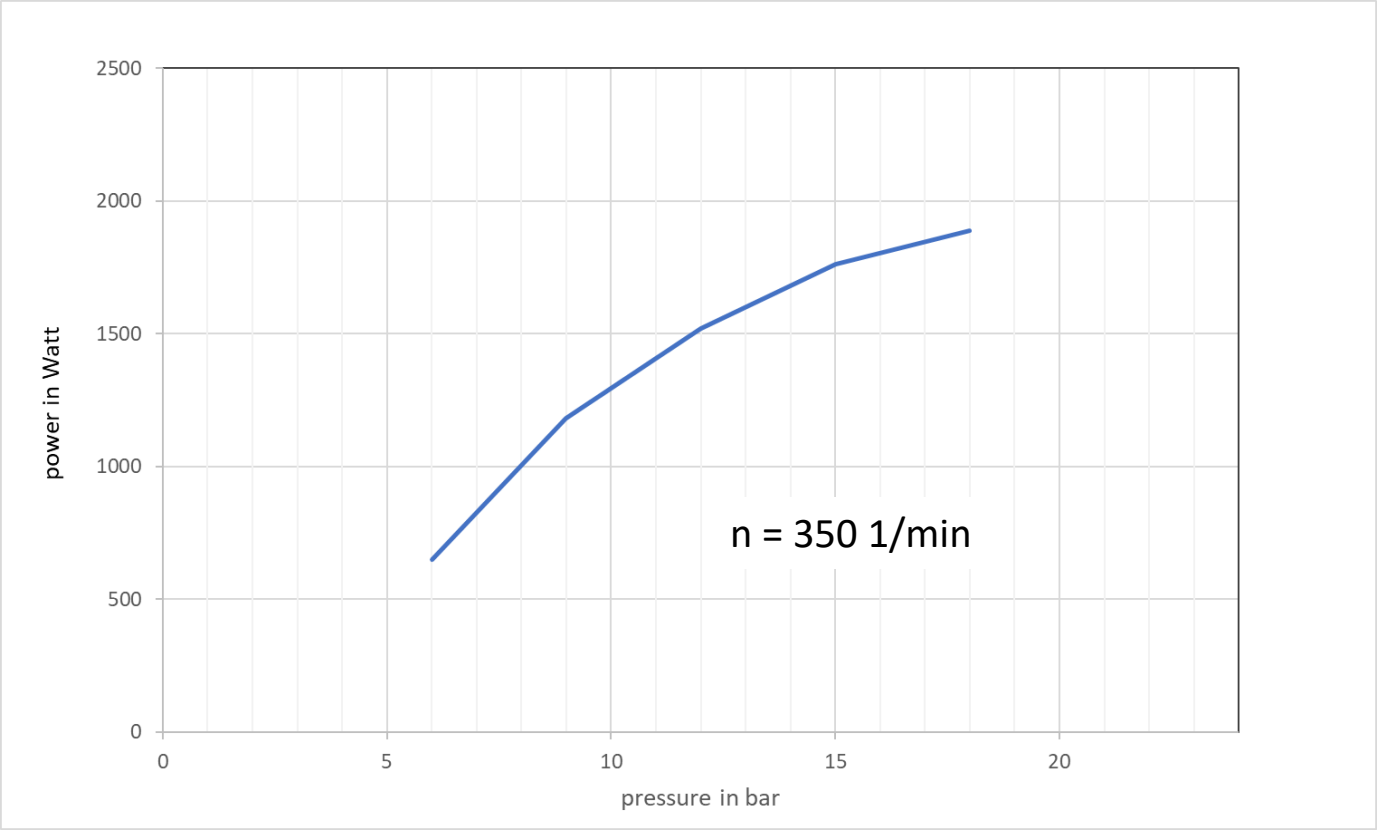
9. Test stand results – prototype



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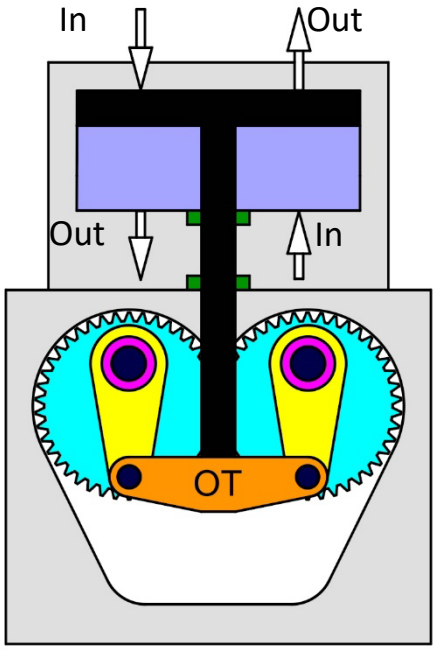

Figure 14 – TDC

Motor displacement: 235 cm³

Ø $_{cyl.}$= 100 mm; stroke = 30 mm

Power: 2 kW (350 1/min at 20 bar)

Motor weight: Approx. 6 kg

Range: 80 – 120 km for
lightweight vehicles with 400 kg empty weight and tank volume up to 1 m³

Fuel costs: < €10/100 km (electricity)

Optimization potential: 10 – 20%

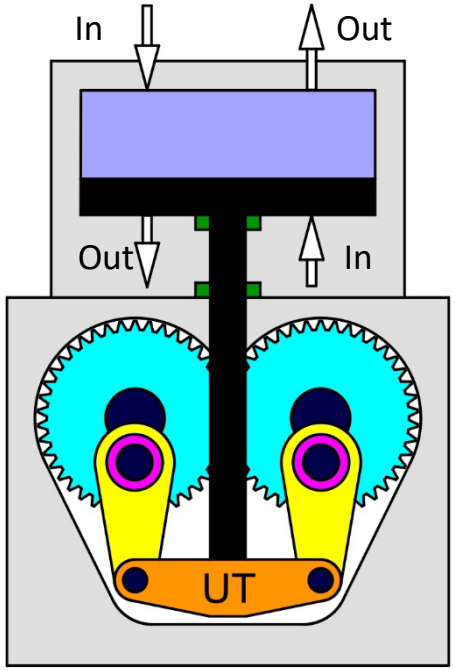

Figure 15 – BDC

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10. Contact us

We are looking forward to your visit to see our prototype

Have you seen our test stand video?
www.pelz-motorenentwicklung.de

Thiele Consulting
Dr.-Ing. Walter Thiele VDI
Phone: +49 (0) 171/1293849
Fax: +49 (0) 228/3683455
E-mail: walterthiele@t-online.de

TC-PME compressed air motor 7.6Da_EN