

More powerful and durable vane machine with stationary and rotating cylinder parts (09 HR 89GO 3D99)

Abstract

A small Croatian company in cooperation with Croatian university has developed a highly sophisticated vane machine. Advantages over conventional vane machines are 80-100% more power in comparison with competitor identical size machines, less working oil needed and 100% longer lifetime with low maintenance costs. The company seeks industrial partners for commercialization of the innovation in the field of hydrogen fuel cells or as compressor for air pre-compression in internal combustion engine

Description

The invention relates to vane machine, where part of the cylinder is stationary while other cylinder parts rotate.

The vane machine may be:

- Working machine for continuous converting fluid energy into mechanical power (machine)
- Driving machine for continuous raising, forcing, compressing, or exhausting fluid by mechanical power or other means (pump)

It belongs to the volumetric rotating machine group which utilizes compressible or incompressible fluids as the working media.

Construction of the classic vane machines, is based on the solution where cylinder together with front and back lateral parts makes a closed working chamber with defined volume, inside which is the rotor. The vanes, which are inserted in longitudinal rotor slots may be axially moved, wherefore they lean against the working chamber lateral parts and wear between surfaces in contact is present.

The essence of this invention is the machine having stationary and rotating cylinder parts. In the stationary

cylinder part there are radial openings that allow the working media to pass through in and out of the cylinder-working chamber. The cylinder rotating parts are roller bearings, firmly inserted in the cylinder stationary part. Bearing inner rings, or additional rings, firmly inserted in the bearing inner rings are actuated by the vanes to rotate. Lateral partitions, closing the cylinder-working chamber, are firmly pulled over the rotor and rotate with it. The vanes with axial and radial grooves are inserted in rotor. Vanes with grooves enhance sealing of working media between the vanes and other parts in contact.

Vane machines with different dimensions have been tested on eddy current dynamometer Magtrol 2WB65 Switzerland and the results have shown advantages over conventional vane machines of 80-100%. In cooperation with a Croatian university the Company has also solved improved sealing among stationary and rotating parts which has been described in new patent.

Innovations and advantages of the offer

The invention solves several technical problems and thus leads to the following advantages over competitor machines:

- Enhanced charging and discharging of the working chamber with the working media
Intake and exhaust canals of the working chamber may be charged and discharged radially. Since the vane does not touch the canals, they may be designed as rectangular openings. This design enables additional increase of cross-sections of the working-media intake and exhaust canals. That improves conditions of charging and discharging of the vane-machine working chamber and leads to volumetric efficiency.
- Decrease of wear of the vane surfaces in contact with the cylinder axial and radial surfaces
The rotating bearing inner or additional rings, and the rotating rotor lateral plates, decrease the relative speed of sliding at the sliding contact points. Thereby their wear and noise decrease and durability increases which leads to mechanical efficiency.
- Enhanced sealing of vanes against the cylinder axial and radial surface

In conclusion, the invented machine offers 80-100%



INDUSTRIAL MANUFACTURING, MATERIAL AND TRANSPORT

Technology Offer

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more power than competitor machines of identical size, and it is 100% more durable and has lower maintenance costs. It doesn't need lubrication which enables clean working surface with more environmental-friendly operation. It also provides much less insensitivity to variations of the pressure and less vibration with high energy efficiency.

Current and Potential Domain of Application

Current Application: a pneumatic tool

Potential Applications:

- a compressor
- an expander for hydrogen fuel cell
- a pump
- a compressor for air pre-compression in internal combustion engines (supercharger)
- an internal combustion engine
- a starter for large diesel engines
- a system for transmission of force, movement and torque
- a system for control, regulation or protection in hydraulic systems
- a system for automatization of working process

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