(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 192 265 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
02.06.2010 Bulletin 2010/22

(51) Int Cl.:
F01C 1/46 *(2006.01)*

(21) Application number: **09460053.3**

(22) Date of filing: **23.11.2009**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR
Designated Extension States:
AL BA RS

(30) Priority: **27.11.2008 PL 38661908**

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(54) **Rotary Machine**

(57) Machine with a rotor, powered by a pneumatic medium, built of a cylindrical body (3) together with concentrically placed shaft, onto which a rotor (1) is placed and sealed together in the body (3). Rotor (1) has a cylindrical shape, and three projections (2) of an involute shape and are sealed in the cylindrical shape of the body (3). In the body, some holes are drilled, acting as inflow (4) and outflow (5) nozzles of the pneumatic medium. Between the nozzles, there are some rotating sealing discs (6) placed symmetrically. The rotational speed of those sealing discs is synchronized with those of the machine's main shaft and hence, with the rotor (1), but their directions are contrary.

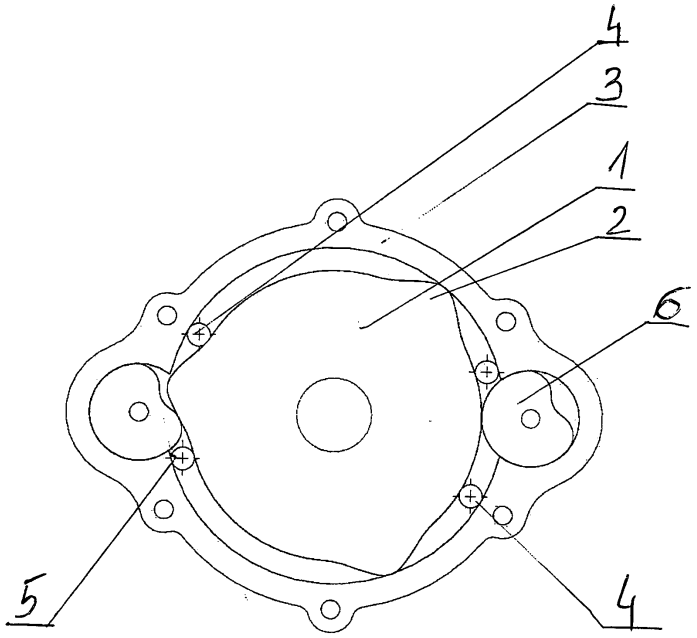

Fig. 1

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Description

[0001] Subject of the design is a machine with a rotating rotor fuelled by a pneumatic medium, acting as an engine, turbine or pump and used for powering household appliances, industrial or transportation devices.

[0002] Machines, engines, turbines and other devices using flat, rotary core are already common and are used for power supply of household appliances, industrial or transportation devices. The well-known engines with a rotary core in a shape close to triangular, with slightly flattened edges, were equipped with a body with an elliptic-shaped chamber, inside of which the piston rotated eccentrically around an axis of a drive shaft. This movement was realized by a geared connection placed inside of the piston, and outside the drive shaft. Other solution, used in German patent and known in Poland as the patent number 61652, is the use of lining in internal engine chamber with a flat rotating piston, which is improving the engine's durability/reliability factor. In yet another German patented solution number 59513, a thermal insulation of a triangular-shaped, rotating piston's layer is implicated for the purpose of increasing the lifetime. Other engines with rotating piston, cylindrical body and rotor in a shape close to elliptical or circular, are also known. Polish patent 76238 describes an engine with an elliptical-shaped piston rotating inside of a cylindrical-shaped body. The described piston has four channels - two of them are inlet channels and the remaining two are outlet channels - and four moveable surfaces of the combustion chambers, which are controlled with the use of pushers. Other approach is presented in the Polish patent specification number 94611. A cylindrical body and eccentrically rotating rotor is equipped with four symmetrically placed turbine vanes, which position is changed centrifugally. In this invention, there are inflow and outflow compressed air channels inside of the body, placed tangentially to the rotor chamber. Between the rotor blades the cut-outs are located asymmetrically and shifted away from symmetry plane in the direction opposite to the rotor movement. In yet another known solution (Polish patent No. 99054), the vane rotor of pneumatic engine is placed on a shaft, concentrically to the body's main chamber. This invention is equipped with the inflow and outflow channels with nozzles inclined with regard to the rotor vanes. In a pneumatic machine with a patent number 185607, a tri-vertex rotor, placed eccentrically on a shaft moves in elliptic body chamber, and the rotor's shaft is equipped with an axial channel, that converts into a radial channel, together with a counterweight.

[0003] The known solutions of pneumatic machines possessed either some defective rotor systems, or very complex construction of the body.

[0004] For the purpose of eliminating those inconveniences, a pneumatic machine with a rotor has been designed, according to the invention's description.

[0005] The hereby invented rotary machine is built of a cylindrically-shaped body with two separate covers and a rotor coaxially fixed on a shaft, sealed together in a collective body. The aim of sealing the system is to prevent the fluid from unexpected leaking. The rotor is cylindrically shaped and it has three splines placed on the apexes of an equilateral triangle. Those splines are involutedly shaped and are sealed in the body's main chamber. Inside of the body, some inflow and outflow boreholes are drilled to enable the flow of pneumatic medium. Those holes are placed on the bottom board of the body, symmetrically and are alternating one another. Between the inflow nozzle and the outflow nozzle, there is a number of symmetrically placed, rotating, round sealing discs, which rotations are synchronized with rotor shaft's rotations but oppositely directed. The sealing discs have circumferential cut-outs with shape corresponding to involutes of the splines on the rotor accordingly. The pneumatic medium, pressured into the chamber through nozzles, causes the pressure in a chamber between cylindrical body and the rotor, to increase. The increased pressure then acts onto the splines, causing the rotor to move until the outflow nozzle is revealed by these splines.

[0006] The presented solution of pneumatic engine with rotary piston is simple, cheap to manufacture and reliable.

[0007] The machine with rotary rotor, according to the invention's description, is shown as an exemplary model on a separate drawing, where fig. 1 shows the cross-section of the machine.

[0008] The machine with a rotary rotor, according to the invention's description, had been exemplary built with a cylindrical body (3), together with covers and concentric to the rotor (1) sealed in the body (3). The rotor (1) has a cylindrical shape and three splines (2) shaping the corners of an equilateral triangle. Those splines have involute-based shapes and are sealed in the body's main chamber (3). In the body (3), some inflow nozzle holes (4) and outflow nozzle holes (5) for the pneumatic medium are drilled, and are placed symmetrically, and alternating one another, on the bottom board of the body (3). Between the inflow (4) and outflow (5) nozzle, the rotating sealing discs (6) are symmetrically placed. The rotational speed of those sealing discs is synchronized with the rotational speed of the main machine shaft placed inside of the rotor (1), but their directions are contrary. The sealing discs (6) have circumferential cut-outs, which shape is adequate to the shape of the splines on the rotor (1), as it had been described. The pneumatic gaseous medium forced through the inflow nozzle (4) causes the pressure inside of the chamber between the body (3) and the rotor (1) to rise, henceforth acting with force onto the splines (2) of the rotor (1). This phenomenon causes the rotor to rotate until the moment, in which the outflow nozzle (5) is revealed by the rotor's splines (2). This cycle is then being repeated with the use of a second pair of nozzles. In some other examples of possible crafting methods, the cylindrical rotor might have an increased number of splines, placed on the apexes of some figures with shapes close to other regular figures, provided that the

number of inflow and outflow nozzles should be adequate to the number of splines.

Claims

1. A machine with a rotor, built of cylindrically-shaped body, together with covers and cylindrically-shaped rotor sealed together in a collective body, placed co-axially to one another. The cylindrical rotor /1/ has three splines imitating the equilateral triangle, and those splines /2/ have the involute shape, and are sealed in the body /3/ in which some holes are made /4/, acting as inflow and outflow nozzles /5/, placed symmetrically and alternating one another. Between the nozzles /4/ and /5/ the sealing discs /6/ had been symmetrically placed. The rotational speed of those sealing discs is synchronized with the rotational speed of the main shaft.

2. In the case of machine with rotational rotor according to the patent claim number one, the sealing discs /6/ rotate in the direction contrary to the rotor /1/ and the main shaft. The cut-outs on the sealing discs have shapes corresponding to the involute shapes of the splines /2/ placed on the rotor /1/.

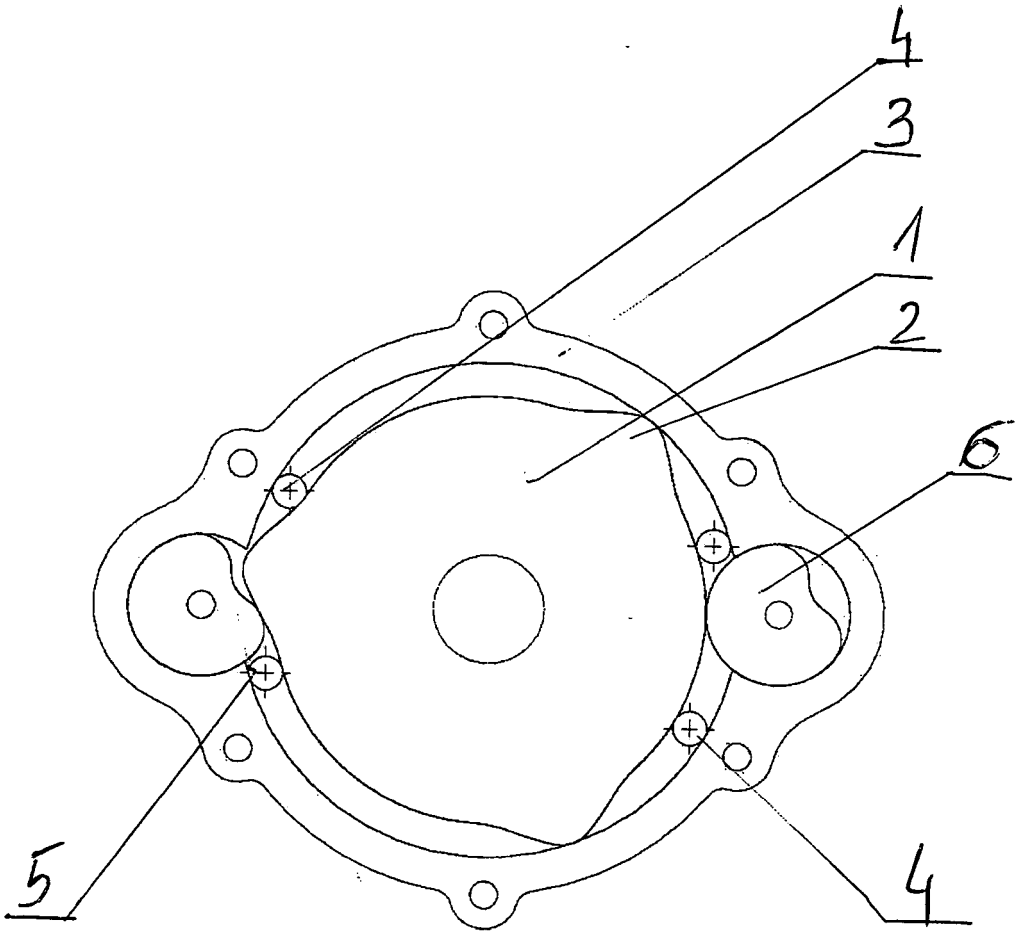

Fig. 1

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- PL 61652 **[0002]**
- DE 59513 **[0002]**
- PL 76238 **[0002]**
- PL 94611 **[0002]**
- PL 99054 **[0002]**
- PL 185607 **[0002]**