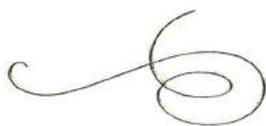


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The Director

of the United States Patent and Trademark Office has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this United States

Patent

grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b). See the Maintenance Fee Notice on the inside of the cover.


DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE



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(12) **United States Patent**
Akmandor

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(45) **Date of Patent:** **Jun. 4, 2019**

(54) **REVOLVING OUTER BODY ROTARY VANE COMPRESSOR OR EXPANDER**

18/328; F04C 18/332; F04C 18/336;
F04C 18/344; F04C 18/3441; F04C
18/3442; F04C 18/356; F04C 18/3562;
F04C 18/3564; F04C 18/38; F04C 18/39;
F04C 18/40; F04C 18/44; F04C 18/46;
F04C 23/003; F04C 23/02; F04C 29/12;
F04C 29/0085

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See application file for complete search history.

(73) Assignee: **PARS MAINA SANAYI VE TICARET LIMITED SIRKETI, Ankara (TR)**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 473 days.

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(21) Appl. No.: **14/933,906**

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(74) *Attorney, Agent, or Firm* — Bryant J. Keller; Kirton McConkie

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US 2017/0130716 A1 May 11, 2017

(51) **Int. Cl.**
F01C 11/00 (2006.01)
F01C 1/32 (2006.01)
(Continued)

(57) **ABSTRACT**

Some implementations of this invention relate to energy systems and more particularly to rotating componentry enabling shaft work, propulsion drive, electric power generation, jet propulsion and/or thermodynamic systems related to aerothermodynamic thrust and shaft power, waste heat recovered shaft power, ventilation, cooling, heat, pressure and/or vacuum generating devices. Some implementations pertain to the art of vane assemblies for eccentrically placed rotating partial admission compressors and expanders that may either be used together or in conjunction with other mechanical, electrical, hydraulic and/or pneumatic machineries. Some implementations further relate to fluid energy recovery mechanical devices, targeting the field of gas turbine engines, internal combustion engines, furnaces, rotary kilns, coolers and refrigeration rotary components and/or expansion nodes. Other implementations are described.

(52) **U.S. Cl.**
CPC **F01C 11/002** (2013.01); **F01C 1/321** (2013.01); **F01C 1/322** (2013.01); **F01C 1/324** (2013.01); **F01C 1/328** (2013.01); **F01C 1/332** (2013.01); **F01C 1/336** (2013.01); **F01C 1/344** (2013.01); **F01C 1/356** (2013.01); **F01C 1/39** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC F01C 1/324; F01C 1/38–46; F01C 1/321–322; F01C 1/328–336; F01C 1/344–3442; F01C 1/356–3564; F01C 11/002; F02C 3/055; F04C 18/324; F04C

20 Claims, 11 Drawing Sheets

