

(12) 按照专利合作条约所公布的国际申请

(19) 世界知识产权组织  
国际局



(10) 国际公布号  
**WO 2024/199370 A1**

(43) 国际公布日  
2024 年 10 月 3 日 (03.10.2024)

(51) 国际专利分类号:  
*F04C 18/14* (2006.01) *F04C 27/00* (2006.01)  
*F04C 18/18* (2006.01)

(21) 国际申请号: PCT/CN2024/084475

(22) 国际申请日: 2024 年 3 月 28 日 (28.03.2024)

(25) 申请语言: 中文

(26) 公布语言: 中文

(30) 优先权:  
202310338837.6 2023年3月31日 (31.03.2023) CN

(71) 申请人: 北京通嘉宏瑞科技有限公司 (BEIJING GRAND RAY TECH CO., LTD.) [CN/CN]; 中国北京市大兴区北京经济技术开发区荣昌东街甲5号3号楼6层601-9, Beijing 100176 (CN)。

(72) 发明人: 雷晓宏 (LEI, Xiaohong); 中国北京市大兴区北京经济技术开发区荣昌东街甲5号3号楼6层601-9, Beijing 100176 (CN)。彭冲 (PENG, Chong); 中国北京市大兴区北京经济技术开发区荣昌东街甲5号3号楼6层601-9, Beijing 100176 (CN)。

魏民 (WEI, Min); 中国北京市大兴区北京经济技术开发区荣昌东街甲5号3号楼6层601-9, Beijing 100176 (CN)。张建华 (ZHANG, Jianhua); 中国北京市大兴区北京经济技术开发区荣昌东街甲5号3号楼6层601-9, Beijing 100176 (CN)。冯伟 (FENG, Wei); 中国北京市大兴区北京经济技术开发区荣昌东街甲5号3号楼6层601-9, Beijing 100176 (CN)。张凯 (ZHANG, Kai); 中国北京市大兴区北京经济技术开发区荣昌东街甲5号3号楼6层601-9, Beijing 100176 (CN)。

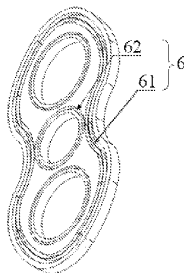
(74) 代理人: 北京中知法苑知识产权代理有限公司 (BEIJING ZZFY INTELLECTUAL PROPERTY AGENCY LTD.); 中国北京市海淀区大钟寺13号院 (华杰大厦) 1号楼10层10C3, Beijing 100098 (CN)。

(81) 指定国 (除另有指明, 要求每一种可提供的国家保护): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ,

(54) Title: ROOTS PUMP ROTOR HAVING PNEUMATIC SEALING GROOVES, AND ROOTS PUMP

(54) 发明名称: 一种带有气动封严凹槽的罗茨泵转子及罗茨泵

[图1]



(57) Abstract: The present disclosure relates to a Roots pump rotor having pneumatic sealing grooves and a Roots pump. Roots vacuum pump rotors work in pairs, and the cross sections, perpendicular to a rotary axis, of both Roots vacuum pump rotors present a 8-shaped leaf outline. Annular pneumatic sealing grooves are formed on the two side surfaces of the 8-shaped leaf shape. When leakage airflow exists between the side surfaces of the two sides of the rotor and the wall surface of a pump body, the pneumatic sealing grooves formed on the side surfaces can reduce the leakage amount in the gap between the side surfaces and the wall face of the pump body. According to the present disclosure, on the basis of the pneumatic sealing principle, a pressure difference on two sides of a sealing device is reduced, and in combination with a vortex structure formed in the grooves when the rotor rotates, without changing the thickness of the rotor, backflow loss and air leakage loss in the gap between the side surfaces of the two sides of the rotor and the wall face of the pump body can be obviously reduced, leakage airflow in the gap caused by the pressure difference in the pump is effectively restrained, and the overall pumping speed is increased.

[见续页]

WO 2024/199370 A1

IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ,  
LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN,  
MU, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA,  
PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD,  
SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ,  
UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW。

(84) 指定国(除另有指明, 要求每一种可提供的地区  
保护): ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ,  
NA, RW, SC, SD, SL, ST, SZ, TZ, UG, ZM, ZW), 欧亚  
(AM, AZ, BY, KG, KZ, RU, TJ, TM), 欧洲 (AL, AT, BE,  
BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR,  
HU, IE, IS, IT, LT, LU, LV, MC, ME, MK, MT, NL, NO,  
PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF,  
CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN,  
TD, TG)。

本国际公布:  
— 包括国际检索报告(条约第21条(3))。

(57) 摘要: 本公开涉及一种带有气动封严凹槽的罗茨泵转子及罗茨泵。罗茨真空泵转子成对工作, 二者垂直于旋转轴线的剖面呈8字叶形轮廓, 8字叶形的两个侧面设置有环形气动封严凹槽, 当转子两侧侧面与泵体壁面的间隙存在泄漏气流时, 在侧面设置的气动封严凹槽能够减少侧面与泵体壁面的间隙的泄露量。本公开通过气动封严的原理, 减小封严装置两侧的压差, 结合转子旋转时在凹槽内形成的涡结构, 在不改变转子厚度尺寸的前提下, 可以明显改善转子两侧侧面与泵体壁面间隙内的倒流损失和漏气损失, 有效抑制泵内由压差所导致的间隙泄漏流动, 提高整体抽速。