

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
12 December 2024 (12.12.2024)



(10) International Publication Number
WO 2024/252121 A1

(51) International Patent Classification:

F04D 19/04 (2006.01) *F16C 32/04* (2006.01)
F04D 25/06 (2006.01) *F04D 29/058* (2006.01)

(21) International Application Number:

PCT/GB2024/051248

(22) International Filing Date:

14 May 2024 (14.05.2024)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

2308520.2 08 June 2023 (08.06.2023) GB

(71) Applicant: **EDWARDS LIMITED** [GB/GB]; Innovation Drive, Burgess Hill, Sussex RH15 9TW (GB).

(72) Inventors: **LUCCHETTA, Emiliano**; Edwards Limited, Innovation Drive, Burgess Hill, Sussex RH15 9TW (GB).
KHOR, Eng Keen; Edwards Limited, Innovation Drive, Burgess Hill, Sussex RH15 9TW (GB).

(74) Agent: **BOOTH, Andrew**; Edwards Limited, Innovation Drive, Burgess Hill RH15 9TW (GB).

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): 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, 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) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT,

(54) Title: PERMANENT MAGNETIC BEARING INSERT

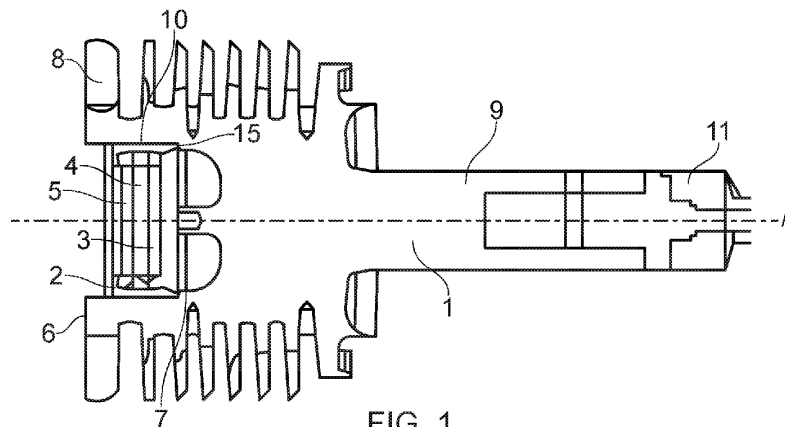


FIG. 1

(57) Abstract: The present invention provides a vacuum pump (1), preferably a turbomolecular pump, comprising a rotor shaft (9) configured to have one or more rotor blades (8) coupled thereto and the rotor shaft (9) defining a bearing well (7) containing, in an interference-fit configuration, a permanent magnetic bearing, wherein the magnetic bearing insert comprises one or more permanent magnet alloy rings (3,4,5) of a rotor bearing half of a permanent magnetic bearing and a radially outwardly extending sleeve (16) coupled thereto around an outer circumference of the or each said permanent magnet alloy ring (3,4,5), and an outer surface of the permanent magnetic bearing insert (3) engages with an inward facing wall of the bearing well (7) to provide an interference fit, wherein the radially outwardly extending sleeve (16) has a coefficient of thermal expansion that is at least substantially the same as the coefficient of thermal expansion of the material of the rotor shaft (9) defining the engaged bearing well wall.

WO 2024/252121 A1

[Continued on next page]

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).

Published:

— *with international search report (Art. 21(3))*