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(71) Applicant: **SIEMENS ENERGY GLOBAL GMBH & CO. KG** [DE/DE]; Otto-Hahn-Ring 6, 81739 München (DE).

(71) Applicant (for BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW only): **SIEMENS ENERGY, INC.** [US/US]; 4400 Alafaya Trail, Orlando, Florida 32826-2399 (US).

(72) Inventors: **JOHANSSON, Bengt**; Ugglegatan 12, 58254 Linköping (SE). **CROSSLEY, Michael**; 18 Southpark Road, Ayr, South Ayrshire KA7 2TL (GB). **LI, Xin-Hai**; Höstvindsvägen 8, 58272 Linköping (SE). **PESARE, Antonio**; Olai Kyrkogata 7A lgh 1101, 60225 Norrköping (SE). **NYGREN, Daniel**; Olaus Petrigatan 6, 11534 Stockholm (SE). **SKRINJAR, Olle**; Lavettvägen 16, 18460 Åkersberga (SE). **GYLLENHAMMAR, Maria**; Skänningevägen 6, 59179 Fomåsa (SE).

(74) Agent: **FIL, Michele S.**; Siemens Energy, Inc. - Intellectual Property Dept., 4400 Alafaya Trail, Orlando, Florida 32817 (US).

(54) Title: GAS TURBINE BLADE

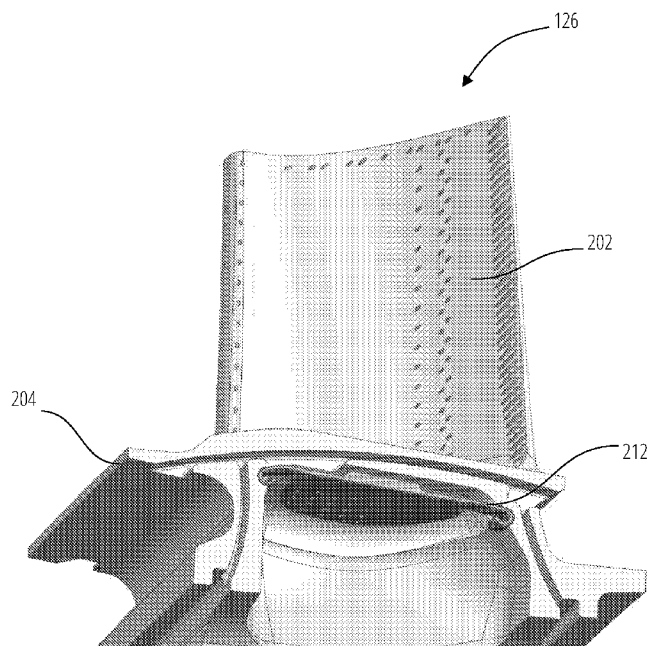


FIG. 3

(57) Abstract: A gas turbine blade including a root for connecting to a rotor of a gas turbine, a platform attached to the root defining a side surface and a groove formed in the side surface, and an airfoil including a metallic substrate extending from a surface of the platform to a tip, the airfoil including a pressure side and a suction side meeting at a trailing edge and a leading edge, and a platform impingement plate. The platform impingement plate includes a circumferential edge surrounding a cavity, the edge positioned to contact the platform, a plate surface positioned to form the cavity between the first surface and the plate surface, and a flat member having a face attached to the plate surface and at least one end portion. A gas turbine blade including a platform sealing wire positioned in a groove of the platform is also provided.





(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, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, IT, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, 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.

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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER INV. F01D5/18 ADD.		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) F01D		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 3 287 596 A1 (SIEMENS AG [DE]) 28 February 2018 (2018-02-28) paragraphs [0029] - [0044] figures 6, 11 -----	1-11, 20-22
A	US 2012/082550 A1 (HARRIS JR JOHN WESLEY [US] ET AL) 5 April 2012 (2012-04-05) paragraphs [0038] - [0057] figures 1-5 -----	1-11, 20-22
☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents :		
"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family	
Date of the actual completion of the international search 18 January 2022	Date of mailing of the international search report 22/03/2022	
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer de la Loma, Andrés	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2021/046709

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims;; it is covered by claims Nos.:
1-11, 20-22

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-11, 20-22

Gas turbine blade comprising an impingement cooled platform with an impingement plate attached to the platform by means of a flat member

2. claims: 12-18

Gas turbine blade comprising a platform sealing wire with a D-shaped cross section.

3. claim: 19

Gas turbine guide vane with a T-shaped inner platform

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2021/046709

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