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F23R 2900/00018**

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(71) Applicant: **RTX Corporation
Farmington, CT 06032 (US)**

(72) Inventors:
• **BINEK, Lawrence A.
East Hartford, 06118 (US)**
• **PAULINO, Jose R.
East Hartford, 06118 (US)**

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(74) Representative: **Dehns
10 Old Bailey
London EC4M 7NG (GB)**

(54) **ADDITIVELY MANUFACTURED CLOCKED FUEL INJECTOR BOLT FOR GAS TURBINE ENGINE COMBUSTOR**

(57) A gas turbine engine combustor includes a unitary, monolithic combustor body (12) and a unitary, monolithic combustor body boss (14) formed in the unitary, monolithic combustor body (12). The unitary, monolithic combustor body (12) includes boss threads (16) and a visual boss clocking indicator (18). The unitary, monolithic combustor body boss (14) is configured to receive,

with the boss threads (16), a fuel injector bolt. The fuel injector bolt includes a bolt head (32) having a visual fuel injector clocking indicator (34), a threaded body (36) that includes fuel injector threads (38), one or more fuel intakes (40), a fuel injector channel (42), and an angled face (44) that includes a fuel orifice (46). The fuel injector threads (38) include a fastener arresting face (48).

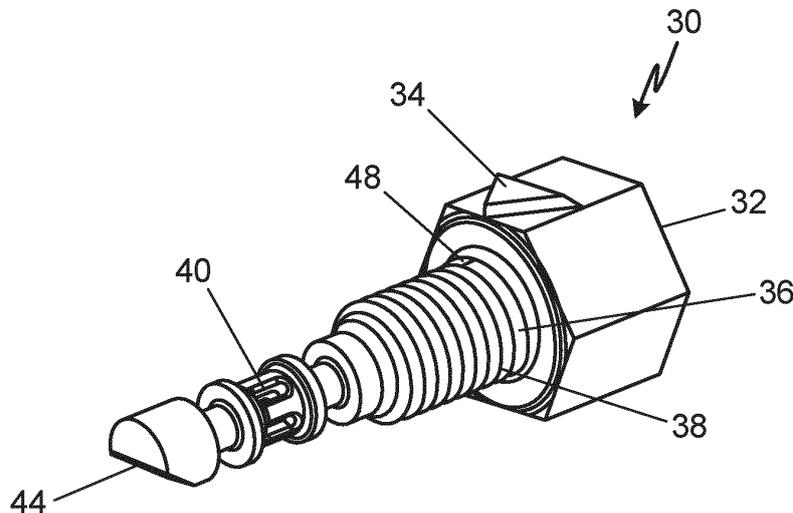


Fig. 2

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EUROPEAN SEARCH REPORT

Application Number

EP 24 20 8409

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DOCUMENTS CONSIDERED TO BE RELEVANT

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)	
X	US 11 060 460 B1 (MCINTYRE II TED LEE [US] ET AL) 13 July 2021 (2021-07-13)	1-5	INV. F23R3/28 F23R3/54	
Y	* column 4, line 46 - column 5, line 13; figures 1-5 * * column 7, line 20 - line 25; figures 6-15 * * column 8, line 5 - line 23; figures 16,17 * * column 9, line 12 - line 18 * -----	6-8		
Y	US 2016/348913 A1 (OTT JOE [US] ET AL) 1 December 2016 (2016-12-01) * paragraph [0013]; figures * -----	6		
X	EP 4 063 734 A1 (RAYTHEON TECH CORP [US]) 28 September 2022 (2022-09-28) * paragraph [0038] - paragraphs [0042], [0064]; figures 1-7,13 * -----	1-5		
A	US 3 192 711 A (MILLER BOB C) 6 July 1965 (1965-07-06) * column 2, line 9 - line 15; figures * -----	1-6		TECHNICAL FIELDS SEARCHED (IPC)
Y	EP 3 865 774 A1 (RAYTHEON TECH CORP [US]) 18 August 2021 (2021-08-18) * paragraphs [0014], [0020]; figures 2,3 * -----	7,8		F23R
A	EP 3 865 775 A1 (RAYTHEON TECH CORP [US]) 18 August 2021 (2021-08-18) * paragraph [0015] - paragraph [0017]; figures 2,3 * -----	7-13		
A	US 2018/229298 A1 (DEANE ERICK J [US] ET AL) 16 August 2018 (2018-08-16) * paragraph [0025] - paragraph [0027]; figures * -----	7-13		
The present search report has been drawn up for all claims				
Place of search The Hague		Date of completion of the search 31 March 2025	Examiner Mootz, Frank	
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document		

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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

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Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

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No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

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LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

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see sheet B

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All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

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As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

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Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

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None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

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The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



**LACK OF UNITY OF INVENTION
SHEET B**

Application Number
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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

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1. claims: 1-6

Fuel injector bolt

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2. claims: 7-13

Gas turbine engine

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82