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(54) Composite abradable material

(57) An abradable material for use at moderate temperatures which is particularly suited for use in the compressor sections of gas turbine engines. Abradable seals of the invention comprise an abradable silicone

polymer matrix which contains a dispersion of hard abradable organic filler particles.

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PARTIAL EUROPEAN SEARCH REPORT

Application Number

which under Rule 45 of the European Patent ConventionEP 00 31 0811 shall be considered, for the purposes of subsequent proceedings, as the European search report

Category	Citation of document with i	CLASSIFICATION OF THE		
Jalegory	of relevant pass	sages	to claim	APPLICATION (Int.Cl.7)
Υ	WO 98 35360 A (CROS	S ROBERT P ;CROSSAN I		F01D11/12
	DAVID (US); LOCTITE		8,10,	F04D29/52
	13 August 1998 (199		14-17	
	* page 1, line 6 - * page 15, paragrap			
		- page 22, line 15 *		
Υ	US 3 547 455 A (DAU	NT JOHN EDWARD)	1,2,5,7,	
	15 December 1970 (1	970-12-15)	8,10,	
	4 column 1 line 44	lino 40	14-17	
	* column 1, line 44 * column 1, line 59			
	* column 2, line 3	- line 47 *		
		MIC MIC SATE		
Α		NA ALEXANDER A ET AL)	1,6	
	15 November 1994 (1			
	* column 3, line 23	- IIIIe 35 *		
Α	US 5 472 315 A (FAW	LEY ROBERT W ET AL)	1,6	
	5 December 1995 (19	95-12-05)	1	
	* column 5, line 1	- line 21 *		TECHNICAL FIELDS SEARCHED (Int.Cl.7)
				FO1D
		-/		F16J
				C09K
				C23C
INCO	MPLETE SEARCH			
not compl		application, or one or more of its claims, doe a meaningful search into the state of the art ly, for these claims.		
Claims se	arched completely :			
Claims se	arched incompletely :			
Claims no	of searched:			
	or the limitation of the search:			
see	sheet C			
	Place of search	Date of completion of the search		Examiner
	THE HAGUE	31 October 2002	Ste	inhauser, U
	ATEGORY OF CITED DOCUMENTS	T: theory or princip		
	icularly relevant if taken alone	E : earlier patent do	ocument, but publis	shed on, or
Y∶part	icularly relevant if taken alone icularly relevant if combined with anot iment of the same category		in the application	
A : tech	nological background written disclosure			corresponding
		or member of the s	James Parcin Idillilly	, ooneaponumu



INCOMPLETE SEARCH SHEET C

Application Number EP 00 31 0811

Claim(s) searched completely: 14,15 Claim(s) searched incompletely: 1-13,16,17 Reason for the limitation of the search:

Claim 1 is formulated in a way that is not consistent with the background and intended application of the material composition is presented throughout the whole application. As stated by the very first sentence of the application as well as the closest prior art document US3575427 cited by the applicant the abradable material composition is clearly and unambiguously intended for a gas turbine engine tip seal. Consequently the search was performed in the field of tip sealing using abradable rubstrips (with a reinforcing structure) and not in the general field of material compositions as implied by claim 1, which is drafted in a much broader sense, i. e. the material composition alone.



EPO FORM 1503 03.82 (P04C10)

PARTIAL EUROPEAN SEARCH REPORT

Application Number

EP 00 31 0811

DOCUMENTS CONSIDERED TO BE RELEVANT	CLASSIFICATION OF THE APPLICATION (Int.CI.7)	
Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	(macr)
US 3 575 427 A (LAPAC EDWARD F ET AL) 20 April 1971 (1971-04-20) * figure 1 *	1,15-17	
		TECHNICAL FIELDS SEARCHED (Int.Cl.7)
	Citation of document with indication, where appropriate, of relevant passages US 3 575 427 A (LAPAC EDWARD F ET AL) 20 April 1971 (1971-04-20) * figure 1 *	Citation of document with indication, where appropriate, of relevant passages US 3 575 427 A (LAPAC EDWARD F ET AL) 20 April 1971 (1971–04–20) * figure 1 *

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

EP 00 31 0811

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 The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

31-10-2002

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
WO 9835	360 A	13-08-1998	EP JP WO US	0892978 2001503471 9835360 6284817	T A1	27-01-1999 13-03-2001 13-08-1998 04-09-2001
US 3547	455 A	15-12-1970	BE DE FR GB JP	749649 2020710 2041798 1305103 50022657	A1 A5 A	01-10-1970 21-01-1971 05-02-1971 31-01-1973 01-08-1975
US 5364	543 A	15-11-1994	US	5304032	A	19-04-1994
US 5472	315 A	05-12-1995	NONE	- 190 ⁰ - 1		NOT THE THE THE SALE AND THE THE THE THE THE THE
US 3575	427 A	20-04-1971	NONE			and the state and and and app app offer the same

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82