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(54) **New superalloys and the methods for improving the properties of superalloys.**

(57) This invention has provided a new technique of improving the properties of superalloys by reducing the segregation of the alloying elements. The characteristic specificity is to reduce the phosphorus content of the alloys to below 0.001 (in wt%) and, in case of Ni-base superalloys, to below 0.0005(wt%). It is needed to eliminate Zr from the superalloys.

Meanwhile, it is also needed to control the proper content of B and to reduce the content of Si to below 0.005. The invention has also provided a series of low segregation superalloys.



European Patent
Office

EUROPEAN SEARCH REPORT

Application number

EP 90 25 0070

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
X	US-A-3 385 698 (R.R. MacFARLANE et al.) * Claim *	1-3	C 22 C 19/05
X	G.W. MEETHAM: "DEVELOPMENT OF GAS TURBINE MATERIALS", 1981, Applied Science Publishers Ltd., London, GB, pages 93, 296-298 * Page 93, second paragraph; page 297, Alloy C1023 *	1,2	
A	GB-A-2 106 138 (ROLLS ROYCE LTD.) * Claim 1; page 4, lines 45-46 *	1-10	
A	EP-A-0 045 563 (THE SECRETARY OF STATE FOR DEFENCE IN HER BRITANNIC MAJESTY'S GOVERNMENT OF THE UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND) * Abstract; page 3, lines 8-10 *	1-10	TECHNICAL FIELDS SEARCHED (Int. Cl. 4)
A	EP-A-0 214 080 (UNITED TECHNOLOGIES CORPORATION) * Claims 1-5 *	1-10,13	C 22 C
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		18-05-1990	GREGG
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone		T : theory or principle underlying the invention	
Y : particularly relevant if combined with another document of the same category		E : earlier patent document, but published on, or after the filing date	
A : technological background		D : document cited in the application	
O : non-written disclosure		L : document cited for other reasons	
P : intermediate document		& : member of the same patent family, corresponding document	



CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ All claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for all claims.
- ☐ Only part of the claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid.
- namely claims:
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

x LACK OF UNITY OF INVENTION

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

namely:

1. Claims 1-10,13-15: Nickel based superalloy with a limited boron content and no zirconium or iron.
2. Claims 11,12: Iron based superalloy with a limited boron content and no zirconium.

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ 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:
- ☒ None of the further search fees has 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: 1-10,13-15

DOCUMENTS CONSIDERED TO BE RELEVANT					
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)		
A	US-A-3 667 938 (W.J. BOESCH) * Claim 1 * --	1-10			
A	GB-A-2 075 057 (ROLLS ROYCE LTD.) * Claims 1,3 * --	6-8			
A	EP-A-0 194 391 (GENERAL ELECTRIC COMPANY) * Claim 1 *	6-8			
A	EP-A-0 237 378 (SNECMA) * Claim 1; page 4, lines 17-22 *	1-10	TECHNICAL FIELDS SEARCHED (Int. Cl. 4)		
A	METAL PROGRESS, vol. 129, no. 4, March 1986, pages 39- 42, Metals Park, Ohio, US; Y. MINGGAO et al.; "Overview: investment casting alloys for aircraft parts" ----				
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX					
Place of search		Date of completion of the search		Examiner	
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					