



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 203 831 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
17.03.2004 Bulletin 2004/12

(51) Int Cl.7: **C22C 38/44**, C22C 38/52,
C21D 6/02

(43) Date of publication A2:
08.05.2002 Bulletin 2002/19

(21) Application number: **01309345.5**

(22) Date of filing: **05.11.2001**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR**
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **03.11.2000 US 705681**

(71) Applicant: **ATI Properties, Inc.**
Albany, Oregon 97321-0580 (US)

(72) Inventors:
• **Antony, Michael M.,
Monroe, North Carolina (US)**
• **Smythe, John W.,
Charlotte, North Carolina, (US)**

(74) Representative: **Baker, Colin John
Eric Potter Clarkson
Park View House
58 The Ropewalk
Nottingham NG1 5DD (GB)**

(54) **Thermal fatigue resistant stainless steel articles**

(57) A die casting die including a stainless steel comprising, by weight, 13 to 16 percent chromium, 0 to less than 0.1 percent carbon, 10 to 17 percent cobalt, 2 to 6 percent molybdenum, 2 to 5 percent nickel, and 0 to 1.5 percent titanium. High strength, high toughness

stainless steels having the indicated composition may exhibit favorable thermal fatigue resistance, Rockwell C hardness greater than 40, and Charpy impact toughness greater than 25 ft-lbs.

EP 1 203 831 A3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 30 9345

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.7)
Y	GB 1 332 061 A (CHROMALLOY AMERICAN CORP) 3 October 1973 (1973-10-03) * page 5, line 55 - line 61; example 1 * ---	1,13,18	C22C38/44 C22C38/52 C21D6/02
Y	US 4 173 471 A (MAL M KUMAR ET AL) 6 November 1979 (1979-11-06) * column 1, line 5 - line 8 * * column 3, line 32 - line 43 * * column 5, line 29 - line 34 * ---	1,13,18	
X	DATABASE WPI Section Ch, Week 198607 Derwent Publications Ltd., London, GB; Class A32, AN 1986-046016 XP002266111 -& JP 61 000565 A (PLUS ENGINEERING KK), 6 January 1986 (1986-01-06) * abstract; example A * ---	13,18	
A	PATENT ABSTRACTS OF JAPAN vol. 018, no. 313 (C-1212), 15 June 1994 (1994-06-15) -& JP 06 065692 A (KUBOTA CORP), 8 March 1994 (1994-03-08) * abstract *		TECHNICAL FIELDS SEARCHED (Int.Cl.7) C22C C21D
A	DATABASE WPI Section Ch, Week 199843 Derwent Publications Ltd., London, GB; Class M21, AN 1998-502071 XP002266112 -& JP 10 219402 A (NIPPON SEIKO KK), 18 August 1998 (1998-08-18) * abstract *		
A	EP 0 866 145 A (ABB RESEARCH LTD) 23 September 1998 (1998-09-23) -----		
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 5 January 2004	Examiner Ashley, G
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			

EPO FORM 1503 03.82 (P04C01)

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

EP 01 30 9345

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.

05-01-2004

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
GB 1332061	A	03-10-1973	DE 2061485 A1	27-04-1972
			FR 2111570 A5	02-06-1972

US 4173471	A	06-11-1979	DE 2903083 A1	09-08-1979
			FR 2415666 A1	24-08-1979
			JP 1382566 C	09-06-1987
			JP 54110120 A	29-08-1979
			JP 61046548 B	15-10-1986

JP 61000565	A	06-01-1986	JP 1441720 C	30-05-1988
			JP 62047943 B	12-10-1987

JP 06065692	A	08-03-1994	JP 2955731 B2	04-10-1999

JP 10219402	A	18-08-1998	NONE	

EP 0866145	A	23-09-1998	DE 19712020 A1	24-09-1998
			AT 239804 T	15-05-2003
			DE 59808216 D1	12-06-2003
			EP 0866145 A2	23-09-1998
			JP 10265914 A	06-10-1998
			US 6030469 A	29-02-2000
