

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
14 June 2001 (14.06.2001)

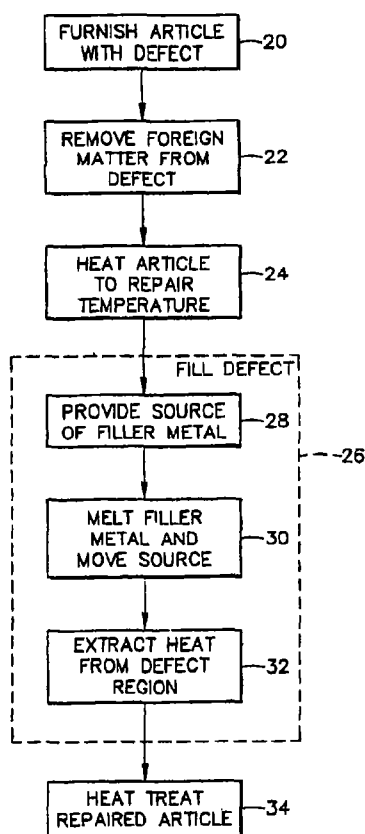
PCT

(10) International Publication Number
WO 01/41970 A1

- (51) International Patent Classification⁷: **B23K 31/02** **Herbert; 5784 Valley Forge Drive, Fairfield, OH 45014 (US). BORNE, Bruce, Leonard; 173 West Dilcrest, Florence, KY 41042 (US).**
- (21) International Application Number: PCT/US00/27785
- (22) International Filing Date: 4 October 2000 (04.10.2000) (74) Agents: MITCHELL, James, W. et al.; General Electric Company, 3135 Easton Turnpike W3C, Fairfield, CT 06431 (US).
- (25) Filing Language: English
- (26) Publication Language: English (81) Designated States (national): AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW.
- (30) Priority Data:
09/459,302 10 December 1999 (10.12.1999) US
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- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European

[Continued on next page]

(54) Title: WELD REPAIR OF DIRECTIONALLY SOLIDIFIED ARTICLES



(57) Abstract: A directionally solidified nickel-based superalloy article (40) has a defect (58) therein extending parallel to the solidification direction (54). The article (40) is repaired by removing any foreign matter present in the defect (58), and then heating the article (40) to a repair temperature of from about 60 to about 98 percent of the solidus temperature of the base material in a chamber containing a protective gas that inhibits oxidation of the base material. The defect (58) is filled with a filler metal while maintaining the article (40) at the repair temperature. The filling is accomplished by providing a source of the filler metal of substantially the same composition as the base material of the directionally solidified article (40), and melting the filler metal into the defect (58) progressively while moving the source of the filler metal relative to the article (40) in a direction parallel to the solidification direction (54). Optionally, additional artificial heat extraction is accomplished in a heat-flow direction that is within about 45 degrees of the solidification direction (54), as the filler metal solidifies within the defect (58). The article (40) may thereafter be heat treated.



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