(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
30 May 2003 (30.05.2003)

PCT

(10) International Publication Number
WO 03/044440 A2

(51) International Patent Classification[7]: F25J

(21) International Application Number: PCT/US02/37124

(22) International Filing Date:
20 November 2002 (20.11.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/989,738 20 November 2001 (20.11.2001) US

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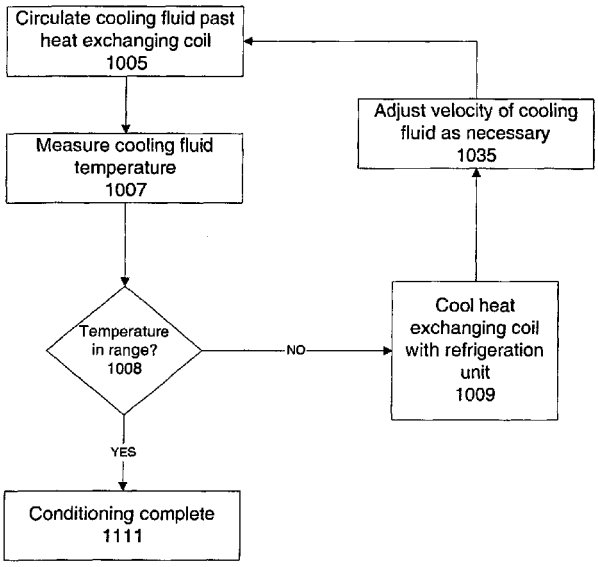
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *without international search report and to be republished upon receipt of that report*

[Continued on next page]

(54) Title: PRE-CONDITIONED SOLUTE FOR USE IN CRYOGENIC PROCESSES



(57) Abstract: Embodiments of the present invention disclose methods for producing pre-conditioned solutes that exhibit no temperature spike during super-cooling in a cryogenic process. In addition, the solutes demonstrate utile capabilities and characteristics such as more efficient heat absorption rates and eutectic material properties which make the pre-conditioned solutes an efficient heat exchange medium. The methods involve super-cooling a solute to induce a long-duration phase change capability. The pre-conditioned solute may be thawed and will retain long-duration phase change capabilities for subsequent freezing cycles if the freezing protocols disclosed herein are followed. Material to be frozen may be directly immersed into pre-conditioned, super-cooled solutes for freezing. The solute may be propylene glycol, glycerol, or other suitable solutes.

WO 03/044440 A2

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