Title: WELDING OF PIPELINE TO ENHANCE STRAIN PERFORMANCE

Begin 402

Determine Specific Strain Demand 403

Determine Pipe Segment and Weld Material 404

Measure Specific Strain Capacity 406

Determine the Geometry of the Overlay Welds 408

Form Strength Weld between Pipe Segments 410

Form Weld Cap Overlapping Strength Weld 412

Form Toughness Weld Adjacent to Cap Weld 414

Form Additional Overlay Welds based on the Determined Geometry 416

End 418

Abstract: A method and apparatus utilized in forming weld joint is described. In the method, a strength weld between two members is formed by a first welding process and a first weld metal. Then, one or more strain welds are formed by depositing a second weld metal adjacent to the strength weld using a second welding process. The strain welds are configured to form a weld joint having a specific minimum height and width to handle tensile strain to a specific strain capacity.
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),

Published:
— with international search report
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
8 November 2007

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Declarations under Rule 4.17:
— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(U))
— as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(Hi))
## INTERNATIONAL SEARCH REPORT

**International application No.**

PCT/US06/41490

**A CLASSIFICATION OF SUBJECT MATTER**

IPC: B23K 2000(2006.01); B23K 3100(2006.01); B23K 9/00(2006.01)

USPC: 228/103,175,225,226;219/61,76. 12,137R

According to International Patent Classification (IPC) or to both national classification and IPC

**B FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S.: 228/101, 103,175,225,226;219/59.1,61,76.1,76.12,137R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Please See Continuation Sheet

**C DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 5,2,8,600 A (ARTHUR) 02 November 1993 (02.11.1993), abstract; column 1, lines 6-18; column 4, lines 25-68; column 5, lines 1-6 and 36-64; column 6, line 1 through column 10, line 42, Example; and Figures 2, 3, 3A, 4, and 4A.</td>
<td>1, 3-7, 9-12</td>
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<td>2, 8, 13-35</td>
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<td>Y</td>
<td>US 6,336,583 B1 (WANG et al) 08 January 2002 (08.01.2002), abstract; column 3, lines 2-58; column 4, lines 35-67; column 5, lines 1-10; column 6, lines 13-67; column 7, lines 1-33; column 8, lines 1-67; column 9, lines 1-67; column 10, lines 1-24; and Figures 2A, 2B, 3A, and 3B.</td>
<td>2, 8, 13-35</td>
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<tr>
<td>Y</td>
<td>US 6,831,250 B2 (HANDA et al) 14 December 2004 (14.12.2004), abstract; column 2, lines 28-67; column 3, lines 1-67; column 4, lines 1-21 and 62-67; column 5, line 1 through column 10, line 15; and Figures 5-13.</td>
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Date of the actual completion of the international search

02 July 2007 (02.07.2007)

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Commissioner for Patents
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Alexandria, Virginia 22313-1450
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Form PCT/ISA/210 (second sheet) (April 2005)
Continuation of B. FIELDS SEARCHED Item 3:
EAST 2.1.0.14; search terms: weld; clad; deposit; bead; nugget; pipe; pipeline; tube; tubular; cylinder; toughness; stress; strain; strength; computer; process; control; data; database