Energy Efficient Method and Apparatus for Exothermic Reactions

Abstract: An energy efficient process scheme for a highly exothermic reaction/distillation system in which the reactor is external to the distillation column and the feed to the reactor comprises a mixture of at least one liquid product stream from the distillation column with or without other liquid/vapor reactants. The reactor is operated under adiabatic and boiling point conditions and at a pressure that results in vaporizing a portion of the liquid flow through the reactor due to the heat of reaction. Under these conditions, reaction temperature is controlled by reactor pressure. The pressure (and hence the temperature) is maintained at a sufficiently high level such that the reactor effluent can be efficiently used to provide reboil heat for the distillation column.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC: B01D 3/34 (2007.01); C07C 7/04 (2007.01)

USPC: 203/25, 27, 29; D10C.6, D10G.68; 250, 253, 402, 910, 911

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.: 203/25, 27, 29; D10C.6, D10G.68; 250, 253, 402, 910, 911

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

NONE

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

EAST, WIST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passage or passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>US 4,450,311 A (WIKKELS et al) 22 May 1984, see Figures 1-3, column 6, lines 21-36.</td>
<td>1-6</td>
</tr>
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<td>Y</td>
<td>US 5,336,831 A (DEGRAFF et al) 09 August 1994, see columns 7-10, abstract.</td>
<td>1-6</td>
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<tr>
<td>A</td>
<td>US 4,008,290 A (WARD) 15 February 1977, see entire document.</td>
<td>1-6</td>
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</table>

See patent family annex.

Further documents are listed in the continuation of Box C.

Date of the actual completion of the international search: 25 November 2006 (25.11.2006)

Date of mailing of the international search report: 23 February 2007 (23 FEB 2007)

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