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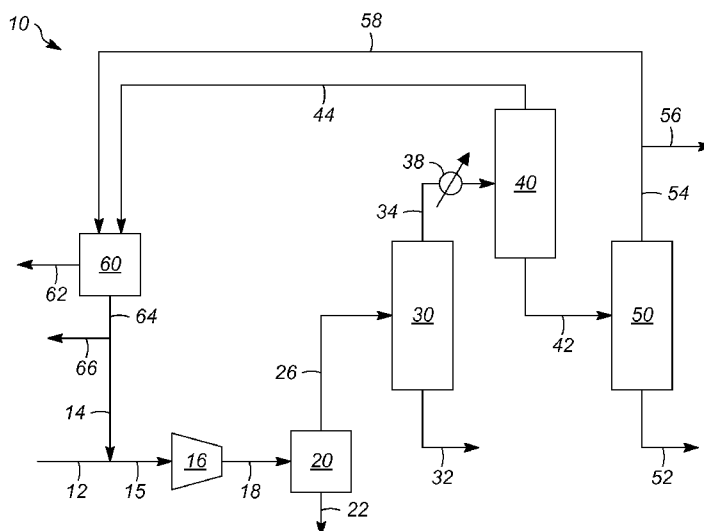
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28 March 2013

(54) Title: IMPROVED METHANE REJECTION AND ETHYLENE RECOVERY



(57) Abstract: A process for the production of an ethylene product stream from a reactor effluent stream includes passing the reactor effluent stream and an ethylene recycle stream to a deethanizer zone to provide a light hydrocarbon feedstream and a C<sub>3</sub>+ stream. The light hydrocarbon stream goes to a demethanizer zone to provide a C<sub>2</sub> bottom stream and an overhead stream, then splitting the C<sub>2</sub> bottom stream into an ethane stream and an ethylene stream. The ethylene stream is divided into a first ethylene product stream and an ethylene co-feed stream, which is fed subsequently to the overhead stream to a pressure swing adsorption process producing an adsorber effluent stream during an adsorption step and a desorbed stream on desorption. The desorbed stream constitutes all or a portion of the ethylene recycle stream.

**A. CLASSIFICATION OF SUBJECT MATTER***C07C 7/12(2006.01)i, C07C 11/04(2006.01)i, B01J 20/10(2006.01)i, B01J 20/20(2006.01)i*

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)

C07C 7/12; F25J 3/02; C07C 7/00; C07C 1/20; B01D 3/00; C10G 57/00

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) &amp; Keywords: ethylene, deethanizer, demethanizer, C2 splitter, PSA, adsorption, oxygenate to olefin, methanol to olefin.

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2002-0007101 A1 (SENETAR, JOHN J. et al.) 17 January 2002 See claims 1-2, 6 & 22; paragraphs [0033] & [0042].	1-10
A	US 7763165 B1 (SCHULTZ, MICHAEL A.) 27 July 2010 See Figure 1; claim 1.	1-10
A	US 5960643 A (KUECHLER, KEITH H. et al.) 05 October 1999 See Figure 1D; claim 50.	1-10
A	US 2007-0260103 A1 (VERMA, VIJENDER K. et al.) 08 November 2007 See Figure 7; claims 1 & 10.	1-10



Further documents are listed in the continuation of Box C.



See patent family annex.

\* Special categories of cited documents:

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"&amp;" document member of the same patent family

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2012/037475**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2002-0007101 A1	17.01.2002	AU 2000-78256 A1 EG 22225 A NO 20004985 A NO 20004985 D0 US 6303841 B1 US 6444869 B2 WO 01-25174 A1	10.05.2001 31.10.2002 05.04.2001 03.10.2000 16.10.2001 03.09.2002 12.04.2001
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US 2007-0260103 A1	08.11.2007	CA 2497943 A1 CN 1715260 A CN 1715260 B EP 1637577 A2 EP 1637577 A3 MX PA05007272 A US 2006-0004242 A1 US 7294749 B2 US 7429686 B2	02.01.2006 04.01.2006 22.06.2011 22.03.2006 31.03.2010 11.01.2006 05.01.2006 13.11.2007 30.09.2008