PatBase - Search results 24 May 2018
Search query (9): 8 and subcool*
Results: 21

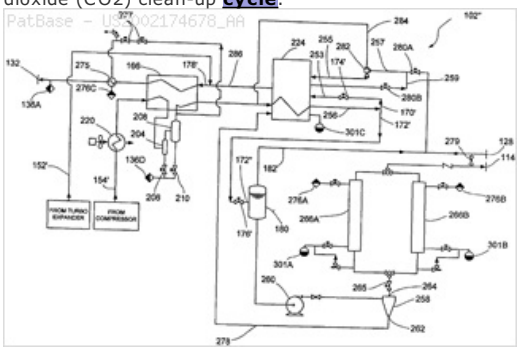
Search history

Search 1:	gas and first and second and refrigerant and (natural or GNL or LNG) (Results 11710)
Search 2:	1 and liquef* and expans* and (mixed) (Results 1591)
Search 3:	2 and phase and separator and tac=(refrigerant and gas and heat* and cool*) (Results 452)
Search 4:	3 and ((first or second) w5 refrigerant) (Results 312)
Search 5:	(4) AND PD=(2006 OR 2012 OR 2003 OR 2008 OR 2009 OR 2007 OR 2004 OR 2010 OR 2011 OR 2005 OR 2001 OR 2000 OR 2002 OR 1976) (Results 199)
Search 6:	(5) AND IPC=(F25) (Results 177)
Search 7:	6 and (non or free) and mixed and closed and (loop or circuit or cycle) (Results 89)
Search 8:	7 and tac=(closed and liquef*) (Results 31)
Search 9:	8 and subcool* (Results 21)

1) Family number: 28273594 (US2002174678A)

Title: APPARATUS FOR THE **LIQUEFACTION** OF **NATURAL** **GAS** AND METHODS RELATED TO SAME

Abstract: An apparatus and method for producing **liquefied** **natural** **gas**. A **liquefaction** plant may be coupled to a source of unpurified **natural** **gas**, such as a **natural** **gas** pipeline at a pressure letdown station. A portion of the **gas** is drawn off and split into a process stream and a **cooling** stream. The **cooling** stream passes through a turbo expander creating work output. A compressor is driven by the work output and compresses the process stream. The compressed process stream is **cooled**, such as by the expanded **cooling** stream. The **cooled**, compressed process stream is divided into **first** and **second** portions with the **first** portion being expanded to **liquefy** the **natural** **gas**. A **gas**-liquid **separator** separates the vapor from the liquid **natural** **gas**. The **second** portion of the **cooled**, compressed process stream is also expanded and used to **cool** the compressed process stream. Additional features and techniques may be integrated with the **liquefaction** process including a water clean-up **cycle** and a carbon dioxide (CO2) clean-up **cycle**.



Classifications:

International (IPC 8-9): B01D21/26 B01D36/04 B01D53/52 B01D9/04 C01B31/20 C01B32/50 C02F1/22 C10L3/06 C10L3/10 F17C5/00 F25B11/02 F25D5/00 F25J1/00 F25J1/02 F25J3/00 F25J3/06 F25J3/08 F25J5/00 F28D7/04 F28D7/10 F28F27/02 (Advanced/Invention);
F25J1/00 F25J3/00 (Advanced/Non-invention);
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F17C F25J (Subclass/Invention);
F25J (Subclass/Non-invention)

International (IPC 1-7): B01D21/26 B01D36/04 B01D9/04 C02F1/22 C10L3/10 F17C3/00 F17C5/00 F25J1/00 F25J1/02 F25J3/00 F25J3/08 F25J5/00 F25L3/00 F28F27/02 F28F7/00 F28F9/22 F28J1/00 F28J3/00

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European: F25J1/00 F25J1/00A6 F25J1/00C2F F25J1/00C2V F25J1/02 F25J1/02A F25J1/02B2 F25J1/02D F25J1/02D2 F25J1/02F F25J1/02F10 F25J1/02K4 F25J1/02Z2 F25J1/02Z2M10 F25J1/02Z2M2 F25J1/02Z4H F25J1/02Z4U F25J3/06A2 F25J3/06C10 F25J3/06C2 F25J3/08 F25J5/00B F28D7/00K F28D7/00K4C F28D7/02F F28D7/04 F28F13/06 R25J205/20 R25J205/60 R25J205/84 R25J210/60 R25J220/62 R25J220/66 R25J220/68 R25J230/60 R25J240/02 R25J240/60 R25J245/90 R25J260/10 R25J270/02 R25J270/08 R25J270/14 R25J270/90 R25J280/02 R25J280/10 R25J280/30 R25J290/42 R25J290/44 R25J290/50 R25J290/62 R25J290/70 R28F19/01 Y02C10/12

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Family:

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Priority:

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Probable Assignee: BATTELLE ENERGY ALLIANCE LLC

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Agent(s): PHILLIPS ORMONDE FITZPATRICK; OYEN WIGGS GREEN AND MUTALA LLP; CLARKE; EVENS PAUL JONATHAN; VEIGA MIKEL; SHAMOTO ICHIO; CHIBA AKIO; MASUI CHUJI; KOBAYASHI YASUSHI; TOMITA HIROYUKI; MIYAMAE TORU; ONO SHINJIRO; HANDE MUMCUOGLU; BATTELLE ENERGY ALLIANCE LLC; JOHN E ALTHOUSE; TRASKBRITT BATTELLE ENERGY ALLIANCE LLC; TRASK BRITT PC; TRASKBRITT; CHRISTIAN STEPHEN R

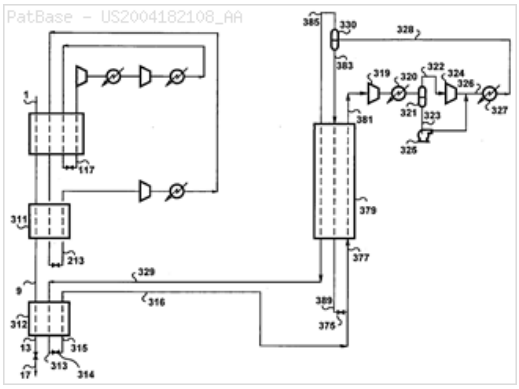
Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW

2) Family number: 30606814 (US2004182108A)

Title: INTEGRATED MULTIPLE-**LOOP** REFRIGERATION PROCESS FOR **GAS** **LIQUEFACTION**

Abstract: Method for **liquefying** a **gas** which comprises **cooling** a feed **gas** stream successively through **first** and **second** temperature ranges to provide a **liquefied** product, wherein refrigeration for **cooling** the feed **gas** stream in the **first** temperature range is provided by a **first** vaporizing **refrigerant** and refrigeration for **cooling** the stream in the **second** temperature range is provided by a **second** vaporizing **refrigerant**, and further wherein an auxiliary **refrigerant** derived from the **second** vaporizing **refrigerant** provides additional refrigeration by vaporization at temperatures above a lowest temperature in the **first** temperature range.

Classifications:
International (IPC 8-9): C09K5/04 C09K5/08 F25B1/00 F25B40/00 F25B9/00 F25J1/00 F25J1/02 (Advanced/Invention);
F25B1/10 F25J1/02 (Advanced/Non-invention);
C09K5/00 F25J1/00 (Core/Invention)
International (IPC 1-7): F25B7/00 F25J1/00 F25J1/02
CPC: F25B1/10 F25B2400/06 F25J1/0295 C09K5/042 C09K2205/132 F25J1/0022 F25J1/0052 F25J1/0055 F25J1/0087 F25J1/0092 F25J1/0214 F25J1/0216 F25J1/0217 F25J1/0218 F25J1/0265 F25J1/0274 F25J1/0291 F25J1/0292
European: C09K5/04B2 F25J1/00A6 F25J1/00C4V F25J1/00C4V2 F25J1/00R6P F25J1/00R6Z F25J1/02D F25J1/02D4 F25J1/02D4P F25J1/02D4P2 F25J1/02D6 F25J1/02D6P F25J1/02Z4H4R F25J1/02Z4R F25J1/02Z6J F25J1/02Z6L F25J1/02Z6S M09K205/132 R25B1/10 R25B400/06
US: 62/114 62/335 62/612 62/612P 62/613



Family:

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EP1613909 B1	20130306	EP20040720953	20040316
EP1613910 A2	20060111	EP20040720954	20040316
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Priority:

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EP20040720953 20040316
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Probable Assignee: AIR PRODUCTS AND CHEMICALS INC

Assignee(s): (std)**:** AIR PROD AND CHEM ; AIR PRODUCTS AND CHEMICALS INC ; EHR PRODAKTS EHND KEMIKALZ INK ; ROBERTS MARK J ; ROBERTS MARK JULIAN

Assignee(s): AIR PRODUCTS AND CHEMICALS INC ALLENTOWN ; AIR PRODUCTS AND CHEMCIALS INC

Inventor(s): (std)**:** ROBERTS MARK JULIAN ; ROBBERTS MARK J ; ROBERTS MARK DZHULIAN ; ROBERTS MARK ; MARK JULIAN ROBERTS ; ROBERTS MARK J

Inventor(s): ROBERTS MARK JULIAN KEMPTON

Agent(s): PIZZEYS PATENT AND TRADE MARK ATTORNEYS PTY LTD; PIZZEYS; MCFADDEN FINCHAM; OSLER HOSKIN AND HARCOURT LLP; KADOR AND PARTNER; MUIR BENJAMIN M J; DE ELZABURU ALBERTO; KIM TAE HONG; AIR PRODUCTS AND CHEMICALS INC PATENT DEPARTMENT; WILLARD

Designated states: AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GW HR HU ID IE IL IN IS IT JP KE KG KP KR KZ LC LI LK LR LS LT LU LV MA MC MD MG MK ML MN MR MW MX MZ NA NE NI NL NO NZ OM PG PH PL PT RO RU SC SD SE SG SI SK SL SN SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW

3) Family number: 31760171 (US2005056051A)

Title: HYBRID **GAS** **LIQUEFACTION** **CYCLE** WITH MULTIPLE EXPANDERS

Abstract: Method for **gas** **liquefaction** comprising **cooling** a feed **gas** by a **first** refrigeration system in a **first** **heat** exchange zone and withdrawing a substantially **liquefied** stream therefrom, further **cooling** the substantially **liquefied** stream by indirect **heat** exchange with one or more work-expanded **refrigerant** streams in a **second** **heat** exchange zone, and withdrawing therefrom a further **cooled**, substantially **liquefied** stream. At least one of the one or more work-expanded **refrigerant** streams is provided by compressing one or more **refrigerant** gases to provide a compressed **refrigerant** stream, **cooling** all or a portion of the compressed **refrigerant** stream in a third **heat** exchange zone to provide a **cooled**, compressed **refrigerant** stream, and work expanding the **cooled**, compressed **refrigerant** stream to provide one of the one or more work-expanded **refrigerant** streams. The flow rate of a work-expanded **refrigerant** stream in the **second** **heat** exchange zone typically is less than the total flow rate of one or more work-expanded **refrigerant** streams in the third **heat** exchange zone.

Classifications:
International (IPC 8-9): C09K5/04 C10L3/06 F25B1/10 F25B5/00 F25B6/00 F25B7/00 F25J1/00 F25J1/02 F25J3/02 F25J5/00 (Advanced/Invention);
F25J1/02 (Advanced/Non-invention);
F25B1/10 F25B5/00 F25B6/00 F25J1/00 (Core/Invention)
International (IPC 1-7): F25J1/00 F25J1/02 F25J5/00
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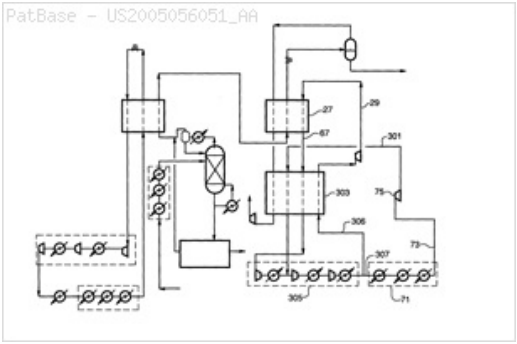

Family:

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IN230006 B	20090327	IN2006CN00906	20060315
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JP4938452 B2	20120523	JP20060526679	20040914
KR100770627 B1	20071029	KR20067005334	20040914
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NO20061677 L	20060613	NO20060001677	20060412
NO338434 B1	20160815	NO20060001677	20060412
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RU2331826 C2	20080820	RU20060112569	20040914
TW200512429 A	20050401	TW20040127656	20040913
TWI251066 B	20060311	TW20040127656	20040913
US2005056051 AA	20050317	US20030664336	20030917
US7127914 BB	20061031	US20030664336	20030917
WO05028976 A1	20050331	WO2004GB03909	20040914

Priority:
US20030664336 20030917 WO2004GB03909 20040914 WO2004GB03909 20060316

Probable Assignee: AIR PRODUCTS AND CHEMICALS INC

Assignee(s): (std): AIR PROD AND CHEM ; AIR PRODUCTS AND CHEMICALS INC ; BROSTOW ADAM ADRIAN ; ROBERTS MARK JULIAN ; SPILSBURY CHRISTOPHER GEOFFREY ; EHR PRODAKTS EHND KEMIKALZ INK

Assignee(s): AIR PRODUCTS AND CHEMICALS LTD ; AIR PRODUCTS AND CHEMICALS

Inventor(s): (std): CHRISTOPHER GEOFFREY SPILSBURY ; GEOFFREY SPILSBURY CHRISTOPHER ; JULIAN ROBERTS MARK ; MARK JULIAN ROBERTS ; ROBERTS MARK ; ROBERTS MARK JULIAN ; ADAM ADRIAN BROSTOW ; ADRIAN BROSTOW ADAM ; ADRIAN ROBERTS MARK JULIAN SPI ; BROSTOW ADAM ; BROSTOW ADAM ADRIAN ; SPILSBURY CHRISTOPHER ; SPILSBURY CHRISTOPHER GEOFFREY ; SPILSBERI KRISTOFER DZHEFFRI ; ROBERTS MARK DZHULIAN ; BROSTOU ADAM ADRIAN

Inventor(s): ROBERTS MARK JULIAN SPILSBURY CHRISTOPHER... ; SPILSBURY,CHRISTOPHER GEOFFREY ; ROBERTS MARK JULIAN SPILSBURY CHRISTOPHER GEOFFREY

Agent(s): PIZZEYS; PIZZEYS PATENT AND TRADE MARK ATTORNEYS PTY LTD; MCFADDEN FINCHAM; OSLER HOSKIN AND HARCOURT LLP; BURFORD ANTHONY FREDERICK; AIR PRODUCTS AND CHEMICALS INC PATENT DEPARTMENT; WILLARD

Designated states: AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GW HR HU ID IE IL IN IS IT JP KE KG KP KR KZ LC LI LK LR LS LT LU LV MA MC MD MG MK ML MN MR MW MX MZ NA NE NI NL NO NZ OM PG PH PL PT RO RU SC SD SE SG SI SK SL SN SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN YU

ZA ZM ZW

4) Family number: 29378598 (US6308531B)

Title: HYBRID CYCLE FOR THE PRODUCTION OF LIQUEFIED NATURAL GAS

Abstract: Refrigeration process for gas liquefaction which utilizes one or more vaporizing refrigerant cycles to provide refrigeration below about -40 degrees centigrade and a gas expander cycle to provide refrigeration below about -100 degrees centigrade Each of these two types of refrigerant systems is utilized in an optimum temperature range which maximizes the efficiency of the particular system. A significant fraction of the total refrigeration power required to liquefy the feed gas (typically more than 5 percent and often more than 10 percent of the total) can be consumed by the vaporizing refrigerant cycles. The invention can be implemented in the design of a new liquefaction plant or can be utilized as a retrofit or expansion of an existing plant by adding gas expander refrigeration circuit to the existing plant refrigeration system.

Classifications:
International (IPC 8-9): F17C5/00 F25J1/00 F25J1/02 (Advanced/Invention); F17C5/00 F25J1/00 (Advanced/Non-invention)
International (IPC 1-7): F17C5/00 F25J1/00 F25J1/02 F25J1/02 F25J3/06
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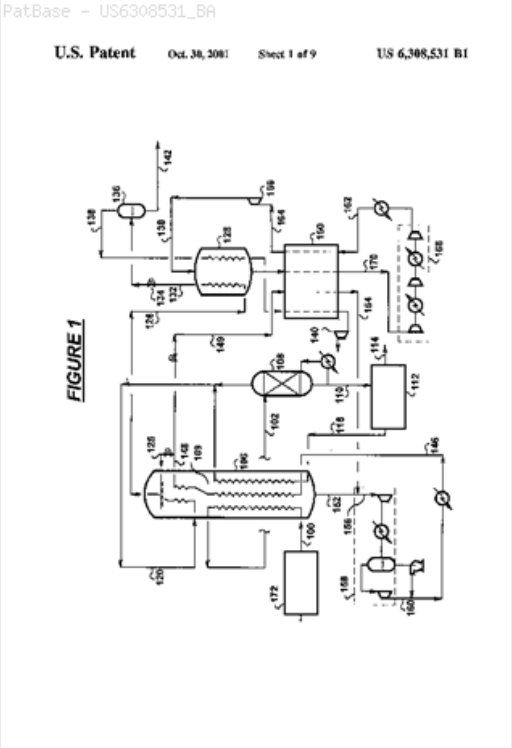
US: 62/611 62/612



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Priority:

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EP20030000698 20001006
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US20030669121 20030923

Probable Assignee: AIR PRODUCTS AND CHEMICALS INC

Assignee(s): (std)**:** AIR PROD AND CHEM

Assignee(s): AIR PROD AND CHEM INC ; AIR PRODUCTS AND CHEMICALS INC

Inventor(s): (std)**:** AGRAWAL RAKESH ; ROBERTS MARK J ; ROBERTS MARK JULIAN

Inventor(s): MARK JULIAN ROBERTS ; RAKESH AGRAWAL

Agent(s): PIZZEYS; PIZZEYS PATENT AND TRADE MARK ATTORNEYS PTY LTD; SULEIMAN I AL AMMAR LAW OFFICE; NISHIYAMA MASAYA; ISHIDA TAKASHI; TSURUTA JUNICHI; HIGUCHI SOTOJI; FUKUMOTO TSUMORU; WILLARD

Designated states: AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE

5) Family number: 45000335 (US2010122551A)

Title: **LIQUEFACTION** METHOD AND SYSTEM

Abstract: A method for **liquefaction** using a **closed** **loop** refrigeration system, the method comprising the steps of (a) compressing a gaseous **refrigerant** stream in at least one compressor; (b) **cooling** the compressed gaseous **refrigerant** stream in a **first** **heat** exchanger; (c) expanding at least a **first** portion of the **cooled**, compressed gaseous **refrigerant** stream from the **first** **heat** exchanger in a **first** expander to provide a **first** expanded gaseous **refrigerant** stream; and (d) **cooling** and substantially **liquefying** a feed **gas** stream to form a substantially **liquefied** feed **gas** stream in a **second** **heat** exchanger through indirect **heat** exchange against at least a **first** portion of the **first** expanded gaseous **refrigerant** stream from the **first** expander, wherein the **first** expanded gaseous **refrigerant** stream exiting the **first** expander is substantially vapor.

Classifications:
International (IPC 8-9): C10L3/00 C10L3/06 F25B9/06 F25B9/10 F25J1/00 F25J1/02 F25J5/00 (Advanced/Invention);
F25J1/00 F25J1/02 (Advanced/Non-invention);
F25J1/00 F25J1/02 F25J5/00 (Core/Invention);
F25J1/02 F25J5/00 (Core/Non-invention)
International (IPC 1-7): F25J 1/02
CPC: F25J1/005 F25J1/0022 F25J1/004 F25J1/0052 F25J1/0072 F25J1/0087 F25J1/009 F25J1/0095 F25J1/0097 F25J1/0204 F25J1/0205 F25J1/0254 F25J1/0263 F25J1/0265 F25J1/0267 F25J1/0268 F25J1/0283 F25J1/0284 F25J1/0288 F25J1/0294 F25J2220/62 F25J2230/08 F25J2230/32 F25J2270/16 F25J2290/62
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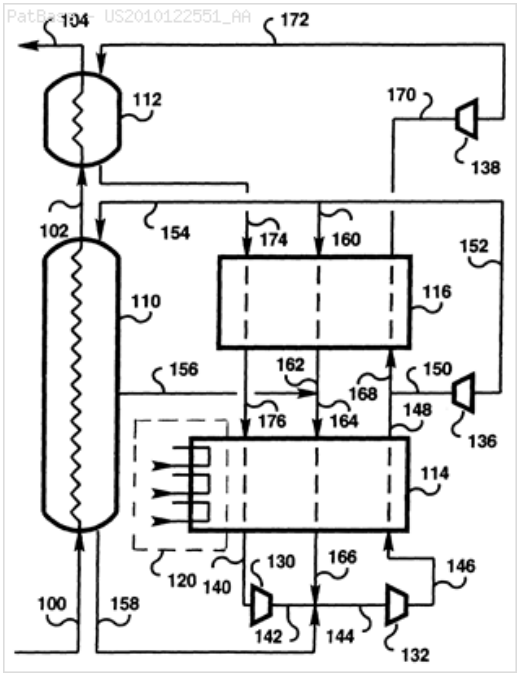

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KR101307663 B1	20130912	KR20117013423	20091116
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MY161470 A	20170414	MY20110001783	20091116
PE01902012 A1	20120330	PE20110000957	20091116
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TH106792 A	20110323	TH20091005089	20091113
TH57109 B	20170831	TH20091005089	20091113
TW201022611 A	20100616	TW20090138902	20091116
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Priority:

US20080272909	20081118	WO2009EP62824	20091002	AU20090318882	20091116
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Probable Assignee: AIR PRODUCTS AND CHEMICALS INC

Assignee(s): (std)**:** AIR PROD AND CHEM ; ROBERTS MARK JULIAN ; BROSTOW ADAM ADRIAN ; EHR PRODAKTS EHND KEMIKALZ INK

Assignee(s): AIR PRODUCTS AND CHEMICALS INC ; AIR PRODUCTS AND CHEMICALS INC US ; AIR PRODUCTS AND CHEMICALS INC7201 HAMILTON BOULEVARDALLENTOWNPA18195-1501US

Inventor(s): (std)**:** ADAM ADRIAN BROSTOW ; ADRIAN BROSTOW ADAM ; BROSTOU ADAM ADRIAN ; BROSTOW ADAM ADRIAN ; JULIAN ROBERTS MARK ; MARK JULIAN ROBERTS ; ROBERTS MARK DZHULIAN ; ROBERTS MARK JULIAN

Inventor(s): ROBERTS MARK JULIANUS ; BROSTOW ADAM ADRIANUS

Agent(s): PIZZEYS; PIZZEYS PATENT AND TRADE MARK ATTORNEYS PTY LTD; MCFADDEN FINCHAM; OSLER HOSKIN AND HARCOURT LLP; MUIR BENJAMIN M J; BECK GREENER; IR MIGNI MYRIASANDRA MIP MSEL; DONALDSON AND BURKINSHAW; AIR PRODUCTS AND CHEMICALS INC PATENT DEPARTMENT; ERIC J

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

6) Family number: 34105473 (US2007012071A)

Title: **LNG** FACILITY PROVIDING ENHANCED LIQUID RECOVERY AND PRODUCT FLEXIBILITY

Abstract: A single **LNG** facility, and operating method therefor, capable of efficiently producing **LNG** products that meet the varying specifications of different **LNG** markets.

Classifications:
International (IPC 8-9): C10L1/04 C10L3/00 C10L3/06 F17C3/08 F25J1/00 F25J1/02 F25J3/00 F25J3/02 F25J5/00 (Advanced/Invention); F25J1/00 F25J3/00 (Advanced/Non-invention); C10L3/00 F17C3/00 F25J1/00 F25J3/00 (Core/Invention)
International (IPC 1-7): F25J1/00
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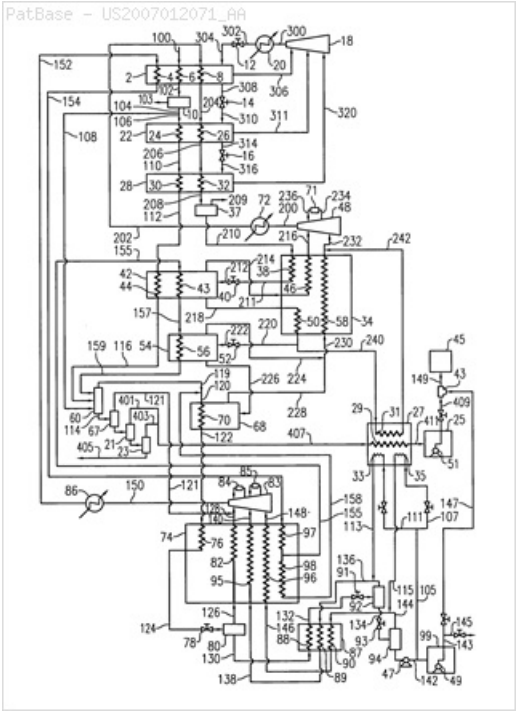

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WO07008638 A3	20090507	WO2006US26459	20060706
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Priority:

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Probable Assignee: CONOCO PHILLIPS CO

Assignee(s): (std): ELLIOT DOUGLAS G ; RANSBARGER WELDON L ; LEE RONG JWYN ; HUANG SHAWN S ; QUALLS WESLEY R ; JONES THOMAS M ; CROFTON HARRY J ; RANSBARGER WELDON ; GOUNDRY PHILIP C ; QUALLS WESLEY ; ELLIOT DOUG ; HUANG SHAWA S ; YAO JAME ; CHEN JONG J ; CHEN JONG JUH ; CONOCO PHILLIPS CO ; CONOCOPHILLIPS CO

Assignee(s): CONOCOPHILLIPS CO SOC ORGANIZADA BAJO LAS LEYES DEL ESTADO DE DELAWARE ; CONOCOPHILLIPS COMPANY

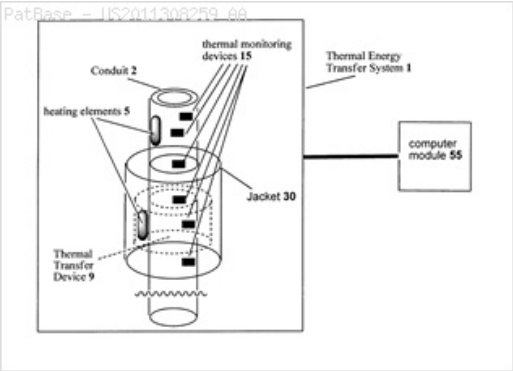
Inventor(s): (std)**:**	QUALLS WESLEY R ; QUALLS WESLEY ; LEE RONG JWYN ; JONES THOMAS M ; HUANG SHAWN S ; HUANG SHAWA S ; GOUNDRY PHILIP C ; ELLIOT DOUGLAS G ; ELLIOT DOUG ; YAO JAME ; CROFTON HARRY J ; CHEN JONG JUH ; CHEN JONG J ; RANSBARGER WELDON L ; RANSBARGER WELDON ; WELDON L RANSBARGER ; RONG JWYN LEE ; JWYN LEE RONG ; JUH CHEN JONG ; JAME YAO
Inventor(s):	DOUGLAS G ELLIOT ; JONG JUH CHEN ; SHAWN S HUANG ; QUALLS WESLEY R ELLIOT DOUGLAS G RANSBAGER WELDON L CHEN JONG JUH HUANG SHAWN S LEE RONG JWYN YAO JAME ; WESLEY R QUALLS ; WESLEY RQUALLS ; WELDON LRANSBARGER ; SHAWN SHUANG ; DOUGLAS GELLIOT ; CHEN JONG ; CROFTON HARRY ; ELLIOT DOUGLAS ; GOUNDRY PHILIP ; HUANG SHAWA ; HUANG SHAWM ; HUANG SHAWN ; JONES THOMAS ; RANSBAGER WELDON L
Agent(s):	PHILLIPS ORMONDE FITZPATRICK; VILLASECA; SULEIMAN I AL AMMAR LAW OFFICE; CONOCOPHILIPS CO IP LEGAL; CONOCOPHILLIPS COMPANY; CONOCOPHILLIPS CO
Designated states:	AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD MG MK ML MN MR MW MX MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

7) Family number: 50124707 (US2011308259A)

Title: METHODS, DEVICES AND SYSTEMS FOR EXTRACTION OF THERMAL ENERGY FROM A **HEAT** CONDUCTING METAL CONDUIT

Abstract: Provided are methods, devices and systems for controlled removal of thermal energy from a fluid within a thermally conducting metal conduit. The system allows for the in situ formation of a reversible plug that can stop the flow of fluid through the conduit, particularly without inducing thermally induced stress fractures or breaches in the conduit. The devices and systems include a thermal transfer device that can be adapted to be in thermal communication with a thermal conducting metal conduit containing a fluid, particularly a flowing fluid. The devices and systems allows for controlled re-**heating** of the conduit without inducing thermally induced stress fractures or breaches in the conduit to restore fluid flow through the conduit.

Classifications:
International (IPC 8-9): F15D1/02 F16L53/00 F16L55/00 F16L55/103 F16L55/164 F25B21/00 F25B21/02 F25B21/04 F25B29/00 F25C1/00 F25C1/18 F25D15/00 F25D3/10 F28D15/00 F28D7/10 F28F1/22 F28F11/00 F28F13/06 F28F13/10 F28F13/12 F28F27/02 F28F3/12 G05D23/00 G05D23/19 G5D23/19 H05B3/02 (Advanced/Invention); F25D15/00 (Core/Invention)
CPC: Y02B30/66 Y02B30/765 F16L55/103 G05D23/192 F28F13/06 F28D7/10 F25B21/02 F25B2321/002 F25D3/10 F25D15/00 Y10T137/0391
European: F16L55/103 G05D23/19E2
US: 137/13 137/13S 165/104.11 165/104.110S 165/109.1 165/109.100S 165/154 165/154S 165/168 165/168S 165/287 165/287S 165/61 165/61S 165/96 219/538 219/538S 62/293 62/3.1 62/3.100S 62/3.2 62/3.200S 62/3.3 62/3.300P 62/66 62/66S 62/67



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Publication number	Publication date	Application number	Application date
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CN103238019 B	20160302	CN201180039493	20110615
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EA201300018 A1	20130830	EA20130000018	20110615
EP2583014 A2	20130424	EP20110740742	20110615
MX2012014339 A1	20130429	MX20120014339	20110615
MX336949 B	20160203	MX20140011963	20121207
TW201211435 A	20120316	TW20110120333	20110610
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US2014190663 AA	20140710	US20140208325	20140313
US2015176929 AA	20150625	US20150638177	20150304
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US9528780 BB	20161227	US20150638177	20150304
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WO11159355 A9	20120322	WO2011US01083	20110615

Priority:

US201003977 59P 20100615 US20100399746P 20100716 US20110517070P 20110412
CN201180039493 20110615 US20110161411 20110615 WO2011US01083 20110615
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Probable Assignee: BIOFILM IP LLC

Assignee(s): (std): BIOFILM IP LLC ; CUTBIRTH HENRY ; WRAY DANIEL X ; WRAY ROBERT J

Inventor(s): (std): CUTBIRTH HENRY ; WRAY DANIEL X ; WRAY ROBERT J

Inventor(s): DANIEL X WRAY ; HENRY CUTBIRTH ; ROBERT J WRAY

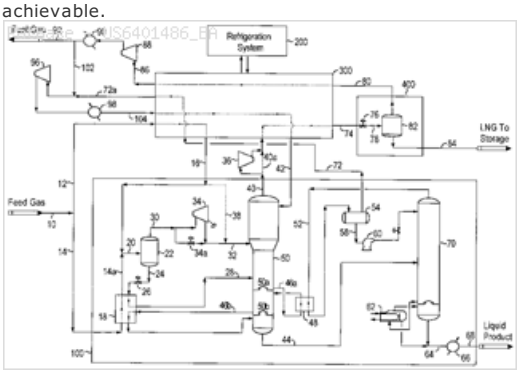
Agent(s): SMART AND BIGGAR; BALDOCK SHARON CLAIRE; STEPHANIE; MCKENNA LONG AND ALDRIDGE LLP; FRANK J; DENTONS US LLP; SEIDMAN STEPHANIE L ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

8) Family number: 29755716 (US6401486B)

Title: ENHANCED NGL RECOVERY UTILIZING REFRIGERATION AND REFLUX FROM **LNG** PLANTS

Abstract: The present invention is directed to methods and apparatus for improving the recovery of the relatively less volatile components from a methane-rich **gas** feed under pressure to produce an NGL product while, at the same time, separately recovering the relatively more volatile components which are liquified to produce an **LNG** product. The methods of the present invention improve separation and efficiency within the NGL recovery column while maintaining column pressure to achieve efficient and economical utilization of the available mechanical refrigeration. The methods of the present invention are particularly useful for removing cyclohexane, benzene and other hazardous, heavy hydrocarbons from a **gas** feed. The benefits of the present invention are achieved by the introduction to the NGL recovery column of an enhanced liquid reflux lean on the NGL components. Further advantages can be achieved by thermally linking a side reboiler for the NGL recovery column with the overhead condenser for the NGL purifying column. Using the methods of the present invention, recoveries of propane and heavier components in excess of 95 percent are readily achievable.



Classifications:
International (IPC 8-9): F25J1/00 F25J1/02 F25J3/00 F25J3/02 (Advanced/Invention); F25J1/00 F25J3/02 (Core/Invention)
International (IPC 1-7): F25J1/00 F25J3/00
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European: F25J1/00A6 F25J1/00C2E F25J1/00C2F F25J1/00C4V F25J1/00C4V2 F25J1/00R6E F25J1/00R6P F25J1/02 F25J1/02B10C F25J1/02D F25J1/02D10 F25J1/02D2 F25J1/02D4P F25J1/02K8D2 F25J1/02Z4H F25J1/02Z4H4R F25J1/02Z4H4R2 F25J1/02Z6A4 F25J1/02Z6J F25J1/02Z6L F25J1/02Z6N F25J3/02A2 F25J3/02C2 F25J3/02C4 F25J3/02C6 R25J200/02 R25J200/04 R25J200/50 R25J200/72 R25J200/74 R25J200/76 R25J200/78 R25J205/04 R25J210/06 R25J215/62 R25J220/60 R25J230/08 R25J230/60 R25J240/02 R25J270/12 R25J270/60 R25J270/66 R25J270/88 R25J280/02 R25J290/12 R25J290/32
US: 62/623 62/630

Family:

Publication number	Publication date	Application number	Application date
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AU200161633 A5	20011126	AU20010061633D	20010516
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DZ3341 A1	20011122	DZ20010003341	20010516
EG23006 A	20031231	EG20010000512	20010516
MY135088 A	20080131	MY20010002361	20010517
OA12269 A	20060511	OA20021000351	20010516
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WO0188447 A1	20011122	WO2001US15721	20010516

Priority:
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Probable Assignee: CONOCO PHILLIPS CO

Assignee(s): (std): CHEN JONG JUH ; LEE RONG JWYN ; PHILLIPS PETROLEUM CO ; PHILLIPS PETROLEUM COMPANY ; YAO JAME ; ELLIOT DOUGLAS G

Assignee(s): IPSI LLC ; CONOCO PHILLIPS CO ; CONOCOPHILLIPS CO

Inventor(s): (std): ELLIOT DOUGLAS G ; JAME YAO ; JONG JUH CHEN ; LEE RONG JWYN ; RONG JWYN LEE ; YAO JAME ; JUH CHEN JONG ; CHEN JONG JUH

Inventor(s): DOUGLAS G ELLIOT

Agent(s): PHILLIPS ORMONDE FITZPATRICK

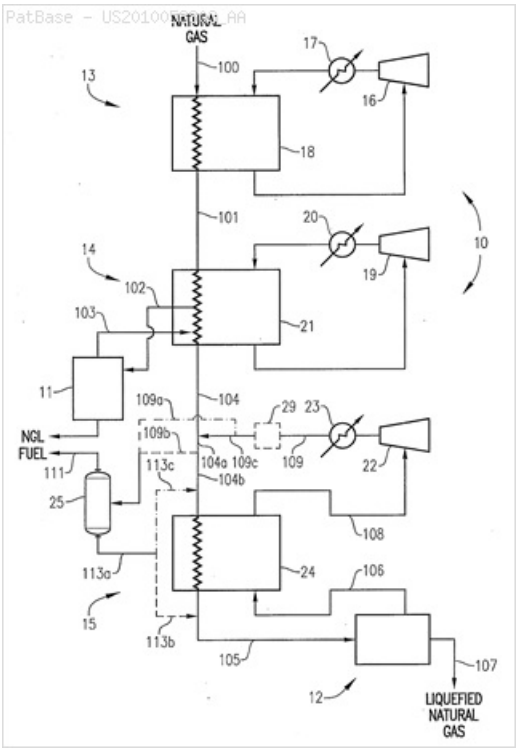
Designated states: AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE ES FI FR GA GB GD GE GH GM GN GR GW HR HU ID IE IL IN IS IT JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MC MD MG MK ML MN MR MW MX MZ NE NL NO NZ PL PT RO RU SD SE SG SI SK SL SN SZ TD TG TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW

9) Family number: 44517445 (US2010058803A)

Title: SYSTEM FOR INCONDENSABLE COMPONENT SEPARATION IN A **LIQUEFIED** **NATURAL** **GAS** FACILITY

Abstract: A **liquefied** **natural** **gas** (**LNG**) facility that employs a system to remove incondensable material from one or more refrigeration **cycles** within the facility. One or more embodiments of the present invention can be advantageously employed in an open-**loop** refrigeration **cycle** to remove at least a portion of one or more high vapor pressure components that have accumulated in the **refrigerant** **cycle** over time. In addition, several embodiments can be advantageously employed to stabilize facility operation in the event of drastic changes to the concentration of the **natural** **gas** feed stream introduced into the facility.

Classifications:
International (IPC 8-9): F25J F25J1/00 F25J1/02 (Advanced/Invention); F25J1/00 (Core/Invention); F25J (Subclass/Invention)
CPC: F25J1/021 F25J1/0022 F25J1/004 F25J1/0052 F25J1/0072 F25J1/0095 F25J1/023 F25J1/0231 F25J1/0249 F25J2220/62 F25J2220/64
European: F25J1/00A6 F25J1/00C2F F25J1/00C4V F25J1/00R4N F25J1/00R8 F25J1/02B10C3 F25J1/02K2C F25J1/02K2R F25J1/02Z2M8 R25J220/62 R25J220/64
US: 62/612 62/612P



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Publication number	Publication date	Application number	Application date
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RU2011113663 A	20121020	RU20110113663	20090814
RU2509968 C2	20140320	RU20110113663	20090814
US2010058803 AA	20100311	US20090554539	20090904
US9644889 BB	20170509	US20090554539	20090904
WO10027629 A2	20100311	WO2009US53837	20090814
WO10027629 A3	20130613	WO2009US53837	20090814

Priority:
US20080095189P 20080908 WO2009US53837 20090814 US20090554539 20090904

Probable Assignee: CONOCO PHILLIPS CO

Assignee(s): (std): CONOCO PHILLIPS CO ; CONOCOPHILLIPS CO ; EVANS MEGAN V ; RANSBARGER WELDON L ; PRADERIO ATTILIO J ; MESSERSMITH DAVID B ; KONOKOFILLIPS KOMPANI

Assignee(s): CONOCOPHILLIPS CO600 N. DAIRY ASHFORD BLDG.IP SERVICES GROUPMA-1065HOUSTONTX77079US ; CONOCOPHILLIPS COMPANY

Inventor(s): (std): REHNSBARDZHER UEHLDON L ; RANSBARGER WELDON L ; PRADERIO ATTILIO J ; PRADERIO ATTILIO DZH ; MESSERSMITH DAVID B ; MESSERSMIT DEHVID B ; EVANS MEGAN V ; EHVANS MEGAN V

Inventor(s): EVANS MEGAN VUS ; MESSERSMITH DAVID BUS ; PRADERIO ATTILIO JUS ; RANSBARGER WELDON LUS ; ATTILIO J PRADERIO ; DAVID B MESSERSMITH ; MEGAN V EVANS ; WELDON L RANSBARGER

Agent(s): PHILLIPS ORMONDE FITZPATRICK; OSLER HOSKIN AND HARCOURT LLP; REINHOLD COHN AND PARTNERS; CONOCOPHILLIPS COMPANY - IP SERVICES GROUP,ATTENTION: DOCKETING; CONOCOPHILLIPS CO IP SERVICES GROUP ATTENTION DOCKETING; CONOCOPHILLIPS CO; HALLER LAUREN E

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

10) Family number: 44517613 (US2010058801A)

Title: SYSTEM FOR ENHANCED **GAS** TURBINE PERFORMANCE IN A **LIQUEFIED** **NATURAL** **GAS** FACILITY

Abstract: A system for **liquefying** **natural** **gas** that includes a process and apparatus for enhancing the performance of one or more **gas** turbines. **Gas** turbine power output can be stabilized or even enhanced using the interstage **cooling** system configured according to one or more embodiments of the present invention. In one embodiment, partially compressed air from a lower compression stage of a **gas** turbine is **cooled** via indirect **heat** exchange with a primary **coolant** before being returned to a higher compression stage of the same **gas** turbine. Optionally, the interstage **cooling** system can employ one or more secondary **coolants** to remove the rejected **heat** from the primary **coolant** system.

Classifications:
International (IPC 8-9): F01D15/00 F02C7/143 F25J F25J1/00 F25J1/02 (Advanced/Invention);
F25J1/00 (Core/Invention);
F25J (Subclass/Invention)
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European: F01D15/00B F02C7/143 F25J1/02 F25J1/02B10C F25J1/02Z6A4 R25J220/64 R25J260/02 R25J270/08 R25J270/12 Y02T50/67F
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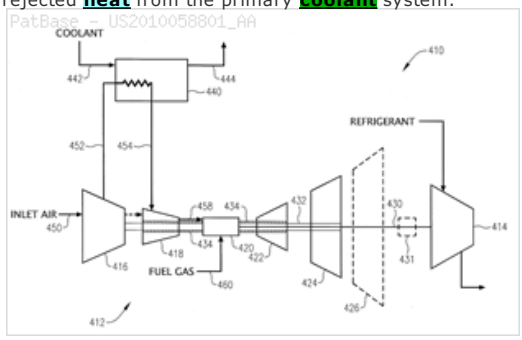

Family:

Publication number	Publication date	Application number	Application date
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Priority:
US20080095469P 20080909 WO2009US52026 20090729 US20090550098 20090828

Probable Assignee: CONOCO PHILLIPS CO

Assignee(s): (std): CONOCO PHILLIPS CO ; CONOCOPHILLIPS CO ; MASANI KARL D ; MEHER HOMJI CYRUS B

Assignee(s): CONOCOPHILLIPS COMPANY

Inventor(s): (std): MASANI KARL D ; MEHER HOMJI CYRUS B

Inventor(s): CYRUS B MEHER HOMJI ; KARL D MASANI

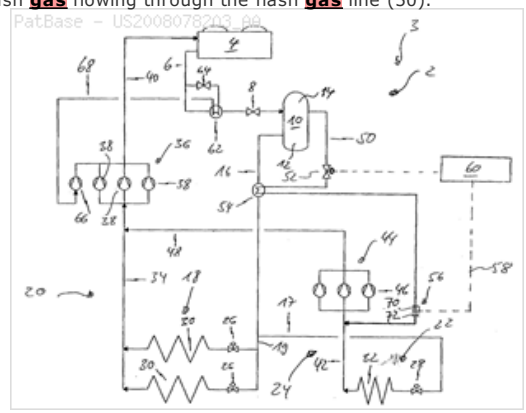
Agent(s): PHILLIPS ORMONDE FITZPATRICK; REINHOLD COHN AND PARTNERS; CONOCOPHILLIPS COMPANY - IP SERVICES GROUP,ATTENTION: DOCKETING; CONOCOPHILLIPS CO IP SERVICES GROUP ATTENTION DOCKETING; CONOCOPHILLIPS CO; HALLER LAUREN E

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

11) Family number: 32653726 (US2008078203A)

Title: CO2 REFRIGERATION **CIRCUIT** WITH SUB-**COOLING** OF THE LIQUID **REFRIGERANT** AGANIST THE RECEIVER FLASH **GAS** AND METHOD FOR OPERATING THE SAME

Abstract: CO_2 refrigeration **circuit** (2) for circulating a **refrigerant** in a predetermined flow direction, comprising in flow direction a hear-rejecting **heat** exchange, (4), a receiver (10) having a liquid portion (12) and a flash **gas** portion (14), and subsequent to the receiver (10) a medium temperature **loop** (20) and a low temperature **loop** (24), wherein the medium and low temperature **loops** (24) each comprise in flow direction an **expansion** device (26, 28), an evaporator (30, 32) and a compressor (46, 38), the refrigeration **circuit** (2) further comprising a liquid line (16) connecting the liquid portion (12) of the receiver (10) with at least one of the medium and low temperature **loops** (20, 24) and having an internal **heat** exchanger (54), and a flash **gas** line (50) connecting the flash **gas** portion (14) of the receiver (10) via the internal **heat** exchanger (54) with the inlet of the low temperature compressor (46), wherein the internal **heat** exchanger (54) transfers in use **heat** from the liquid flowing through the liquid line (16) to the flash **gas** flowing through the flash **gas** line (50).



Classifications:
International (IPC 8-9): F25B1/00 F25B1/10 F25B39/04 F25B40/02 F25B40/06 F25B41/00 F25B41/04 F25B49/00 F25B49/02 F25B5/00 F25B9/00 (Advanced/Invention);
F25B1/10 F25B40/04 F25B49/02 F25B5/02 (Advanced/Non-invention);
F25B1/10 F25B39/04 F25B41/00 F25B41/04 F25B5/00 F25B9/00 (Core/Invention);
F25B40/00 F25B49/02 F25B5/00 (Core/Non-invention);
F25B (Subclass/Invention)
International (IPC 1-7): F25B1/10 F25B41/04 F25B9/00
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US: 1/1 62/115 62/115P 62/117 62/117P 62/196.4 62/196.400P 62/228.3 62/335 62/498 62/498S 62/509 62/509S 62/510 62/510P

Family:

Publication number	Publication date	Application number	Application date
AT503158 E	20110415	AT20050775838T	20050729
AT544992 E	20120215	AT20050723393T	20050218
AU2005270472 AA	20060216	AU20050270472	20050729
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EP1794510 A1	20070613	EP20050723393	20050218
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HK1144011 A1	20130516	HK20100110346	20101104
KR20070046847 A	20070503	KR20077003141	20070208
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Priority:

DE200410038640 20040809	DE200438800640 20040809	EP20050723393 20050218
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WO2005EP08255 20050729	US20070659926 20070209	US20080659926 20080102
US20110227550 20110908	US20140499826 20140929	US20140499852 20140929

Probable Assignee: CARRIER CORP

Assignee(s): (std)**:** LINDE KAELTETECHNIK GMBH AND CO ; GERNEMANN ANDREAS ; HEINBOKEL BERND ; SCHIERHORN UWE ; LINDE KALTETECHNIK GMBH ; LINDE KAELTETECHNIK GMBH ; CARRIER CORP ; DURAISAMY SURESH ; KEHRRIER CORP

Assignee(s): LINDE KAELTETECHNIK GMBH AND CO KG ; CARRIER FARMINGTON CORP ; CARRIER KALTETECHNIK DEUTSCHLAND GMBH ; KEHRRIER KORPOREJSHN

Inventor(s): (std)**:** SURESH DURAISAMY ; UWE GERNEMANN ANDREAS HEINBOKE ; UWE SCHIERHORN ; SCHIERHORN UWE ; HEINBOKEL BERND ; GERNEMANN ANDREAS ; DURAISAMY SURESH ; BERND HEINBOKEL ; ANDREAS GERNEMANN

Inventor(s): GERNEMANN ANDREAS HEINBOKEL BERND SCHIERHORN UWE ; DIE ERFINDERNENNUNG LIEGT NOCH NICHT VOR ; DURAISAMY SURESH C O CARRIER FARMINGTON CORP ; DURAISAMY SURESH C O CARRIER CORPORATION

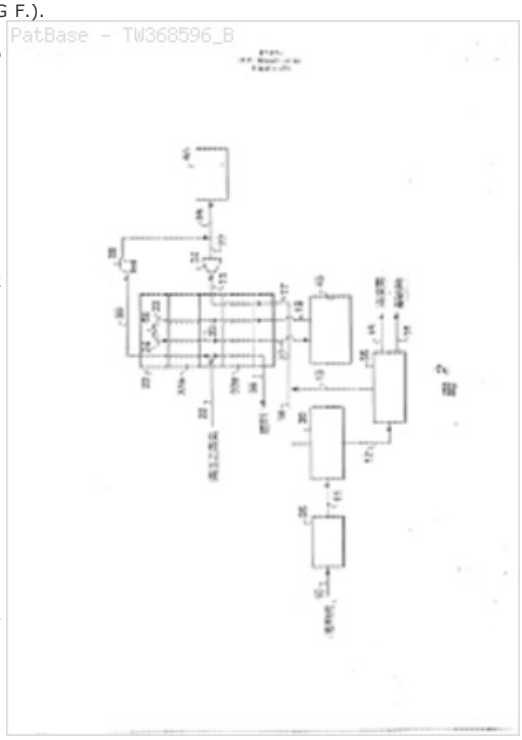
Agent(s): PHILLIPS ORMONDE FITZPATRICK; KSNH PATENTANWAELTE KLUNKER SCHMITT NILSON HIRSCH; KLUNKER SCHMITT NILSON HIRSCH; KLUNKER HANS FRIEDRICH; SCHMITT NILSON SCHRAUD WAIBEL WOHLFROM PATENTANWAELTE PARTNERSCHAFT MBB; HOEHFELD JOCHEN; BACHMAN AND LAPOINTE PC UTC; BACHMAN AND LAPOINTE PC

Designated states: AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GW HR HU ID IE IL IN IS IT JP KE KG KM KP KR KZ LC LI LK LR LS LT LU LV MA MC MD MG MK ML MN MR MW MX MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RU SC SD SE SG SI SK SL SM SN SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW

12) Family number: 33375585 (GB199930052A)

Title: IMPROVED MULTI-COMPONENT REFRIGERATION PROCESS FOR **LIQUEFACTION** OF **NATURAL** **GAS**

Abstract: This invention relates to a process for **liquefying** a pressurized **gas** stream rich in methane in which the **liquefication** of the **gas** stream occurs in a **heat** exchanger being **cooled** by a **closed**-**loop** multi-component refrigeration system to produce a methane-rich liquid product having a temperature above about -112 DEG C. (-170 DEG F.) and a pressure sufficient for the liquid product to be at or below its bubble point. The **liquefied** **gas** product is then introduced to a storage means at a temperature above about -112 DEG C. (-170 DEG F.).



Classifications:

International (IPC 8-9): B23K35/30 B23K9/173 B60K15/03 C10L3/06 C22C38/00 C22C38/04 C22C38/06 C22C38/08 C22C38/12 C22C38/14 C22C38/16 F17C1/00 F17C1/14 F17C13/00 F17C3/00 F17C3/02 F17C7/00 F17C7/02 F17C9/00 F17D1/08 F25J1/00 F25J1/02 F25J3/02 (Advanced/Invention); F17C9/00 F25J1/00 F25J3/02 (Advanced/Non-invention); F25J1/02 (Core/Non-invention)

International (IPC 1-7): C10L3/06 F17C13/00 F17C9/00 F25J1/00 F25J1/02 F25J3/00 F25J3/02 F25J3/06

CPC: F25J1/0035 F25J1/0085 F25J1/0087 F25J1/0095 B23K9/173 B23K35/3066 B60K15/03006 C22C38/001 C22C38/04 C22C38/06 C22C38/08 C22C38/12 C22C38/14 C22C38/16 F17C1/00 F17C1/002 F17C1/14 F17C3/00 F17C3/025 F17C7/00 F17C7/02 F17C13/001 F17C2203/0648 F17C2205/0323 F17C2221/033 F17C2223/0123 F17C2223/033 F17C2223/035 F17C2225/0123 F17C2225/0161 F17C2225/033 F17C2225/035 F17C2250/03 F17C2260/046 F17C2265/017 F17C2265/022 F17C2265/033 F17C2265/034 F17C2265/035 F17C2265/036 F17C2265/037 F17C2265/066 F17C2265/068 F17C2270/0105 F17C2270/0171 F17C2270/0173 F17D1/082 F25J1/0022 F25J1/0042 F25J1/0052 F25J1/0055 F25J1/0212 F25J1/0231 F25J1/025 F25J1/0254 F25J1/0291 F25J1/0292 F25J2205/04 F25J2205/50 F25J2220/64 F25J2230/08 F25J2230/60 F25J2235/60 F25J2245/90 F25J2290/62 F25J2210/04 F25J1/004 F25J1/0215 F25J1/0219 F25J2245/02

European: B23K35/30H4 B23K9/173 B60K15/03B C22C38/00B C22C38/04 C22C38/06 C22C38/08 C22C38/12 C22C38/14 C22C38/16 F17C1/00 F17C1/00B F17C1/14 F17C13/00B F17C3/00 F17C3/02C F17C7/00 F17C7/02 F17D1/08B F25J1/00A6 F25J1/00C2L F25J1/00C4V F25J1/00C4V2 F25J1/02D F25J1/02D2 F25J1/02D4P F25J1/02K2R F25J1/02Z2M8P F25J1/02Z2T F25J1/02Z6J F25J1/02Z6L R17C203/06B1C R17C205/03L5 R17C221/03B1 R17C223/01A3 R17C223/03B R17C223/03C R17C225/01A3 R17C225/01B1B R17C225/03B R17C225/03C R17C250/03 R17C260/04C R17C265/01B1 R17C265/02A R17C265/03B1 R17C265/03B1A R17C265/03B1B R17C265/03B2 R17C265/03B3 R17C265/06D R17C265/06E R17C270/01A1 R17C270/01D1A R17C270/01D1B R25J205/04 R25J205/50 R25J220/64 R25J230/08 R25J230/60 R25J235/60 R25J245/90 R25J290/62

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CA2292713 AA	19981230	CA19982292713	19980618
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GB199930052 A0	20000209	GB19990030052	19980618
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SE521642 C2	20031118	SE19990004611	19991216
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Priority:

US19970050280P 19970620 US19980079782P 19980327 WO1998US12872 19980618

Probable Assignee: EXXON MOBIL CORP

Assignee(s): (std)**:** EXXON PRODUCTION RES CO H ; EXXONMOBIL UPSTREAM RES CO ; EXXON PRODUCTION RESEARCH CO ; EXXON PRODUCTION RESEARCH COMPANY ; EXXON PRODUCTION RESEARCH CO HOUSTON TEXAS ; EXXON PRODUCTION RES COMPANY H ; EXXON MOBIL UPSTREAM RES COMPA ; EXXON MOBIL UPSTREAM RESEARCH CO

Assignee(s): EXXON MOBIL UPSTREAM RESEARCH COMPANY ; BOWEN RONALD R ; COLE ERIC T ; EXXON MOBIL CORP ; EXXONMOBIL UPSTREAM RESEARCH COMPANY ; EXXONMOBIL UPSTREAM RESEARCH CO ; EXXON PRODUCTION RESEARCH COMPANYUS ; KELLEY LONNY R ; EXXONMOBIL UPSTREAM RESEARCH CO HOUSTON TEXAS ; KIMBLE EDWARD L ; THOMAS EUGENE R ; EXXON PRODUCTION RESEARCH CO HOUSTON ; EXXONMOBIL UPSTREAM RESEARCH COMPANY HOUSTON TEXAS ; EXXON PRODUCTION RESEARCH COMPANY HOUSTON TEXAS

Inventor(s): (std)**:** BOWEN RONALD R ; COLE ERIC T ; EDWARD L KIMBLE ; ERIC T COLE ; EUGENE R THOMAS ; KELLEY LONNEY R ; KELLEY LONNY R ; KELLEY LONNY RAY ; KELLY LONNY R ; KIMBLE EDWARD L ; KIMBLE EDWARD LAWRENCE ; LONNY R KELLEY ; OWEN RONALD R ; RONALD R BOWEN ; THOMAS EUGENE R

Inventor(s): R KELLEY LONNY ; LONNY RAY KELLEY

Agent(s): WATERMARK PATENT AND TRADE MARKS ATTORNEYS; WATERMARK INTELLECTUAL PROPERTY PTY LTD; BORDEN LADNER GERVAIS LLP; JOSE ANTONIO LLOREDA; REINHOLD COHN AND PARTNERS

Designated states: AM AT AZ BE BF BJ BY CF CG CH CI CM CY DE DK ES FI FR GA GB GH GR IE IT KE KG KZ LU MC MD MR NE NL PT RU SD SE SN SZ TG TJ UG ZW

13) Family number: 49584477 (US2011226008A)

Title: INTEGRATED PRE-**COOLED** **MIXED** **REFRIGERANT** SYSTEM AND METHOD

Abstract: A system and method for **cooling** and **liquefying** a **gas** in a **heat** exchanger that includes compressing and **cooling** a **mixed** **refrigerant** using **first** and last compression and **cooling** **cycles** so that high pressure liquid and vapor streams are formed. The high pressure liquid and vapor streams are **cooled** in the **heat** exchanger and then expanded so that a primary refrigeration stream is provided in the **heat** exchanger. The **mixed** **refrigerant** is **cooled** and equilibrated between the **first** and last compression and **cooling** **cycles** so that a pre-**cool** liquid stream is formed and **subcooled** in the **heat** exchanger. The stream is then expanded and passed through the **heat** exchanger as a pre-**cool** refrigeration stream. A stream of **gas** is passed through the **heat** exchanger in countercurrent **heat** exchange with the primary refrigeration stream and the pre-**cool** refrigeration stream so that the **gas** is **cooled**. A resulting vapor stream from the primary refrigeration stream passage and a two-**phase** stream from the pre-**cool** refrigeration stream passage exit the warm end of the exchanger and are combined and undergo a simultaneous **heat** and mass transfer operation prior to the **first** compression and **cooling** **cycle** so that a reduced temperature vapor stream is provided to the **first** stage compressor so as to lower power consumption by the system. Additionally, the warm end of the **cooling** curve is nearly **closed** further reducing power consumption. Heavy components of the **refrigerant** are also kept out of the cold end of the process, reducing the possibility of **refrigerant** freezing, as well as facilitating a **refrigerant** management scheme.

Classifications:
International (IPC 8-9): C10L3/06 F25B1/00 F25B27/00 F25B5/02 F25J1/00 F25J1/02 F25J5/00 (Advanced/Invention); F25B1/00 F25B27/00 F25J1/00 F25J5/00 (Core/Invention)
International (IPC 1-7): F25J1/02
CPC: F25J1/0292 F25J2270/66 F25J1/0012 F25J1/0015 F25J1/0212 F25J1/0214 F25J1/0216 F25J1/0279 F25J1/0291 F25J2205/90 F25J2220/62 F25J2220/64 F25J1/02 F25J5/00 F25J1/0022 F25J1/0218 F25J1/0217 F25J1/0297 F25J2270/60 F25J2205/02 F25J2235/02 F25J1/0055
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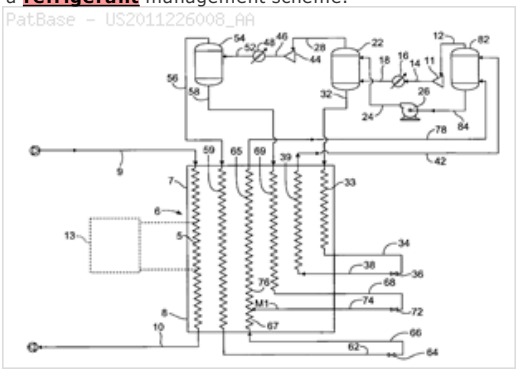
US: 1/1 62/612 62/613 62/613P



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US2017051968 AA	20170223	US20160345957	20161108
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Priority:

US20100726142 20100317 CN201180023625 20110304 JP20130500070T 20110304
WO2011US27162 20110304 US20160227235 20160803 US20160345957 20161108

Probable Assignee: CHART INC

Assignee(s): (std): CHART ENERGY AND CHEMICALS INC ; CHART INC ; DUCOTE DOUG DOUGLAS JR ; GUSHANAS TIM ; PODOLSKI JAMES ; DUCOTE JR DOUG DOUGLAS

Assignee(s): JPMORGAN CHASE BANK NA ADMINISTRATIVE AGENT AS

Inventor(s): (std): DOUGLAS A DUCOTE JR ; DUCOTE DOUG DOUGLAS ; DUCOTE DOUG DOUGLAS JR ; DUCOTE DOUGLAS A JR ; DUCOTE JR DOUGLAS A ; GUSHANAS TIM ; GUSHANAS TIMOTHY P ; JAMES PODOLSKI ; PODOLSKI JAMES ; TIMOTHY P GUSHANAS ; TIM GUSHANAS ; DOUG DOUGLAS DUCOTE JR ; DUCOTE JR DOUG DOUGLAS

Agent(s): SPRUSON AND FERGUSON; BLAKE CASSELS AND GRAYDON LLP; Dauncey Mark Peter; HOSHINO OSAMU; ONO SHINJIRO; TOMITA HIROYUKI; KOBAYASHI YASUSHI; MIYAMAE TORU; YAMAMOTO OSAMU; TAKEUCHI SHIGEO; COOK ALEX LTD; JOHNSTON BLAKE R

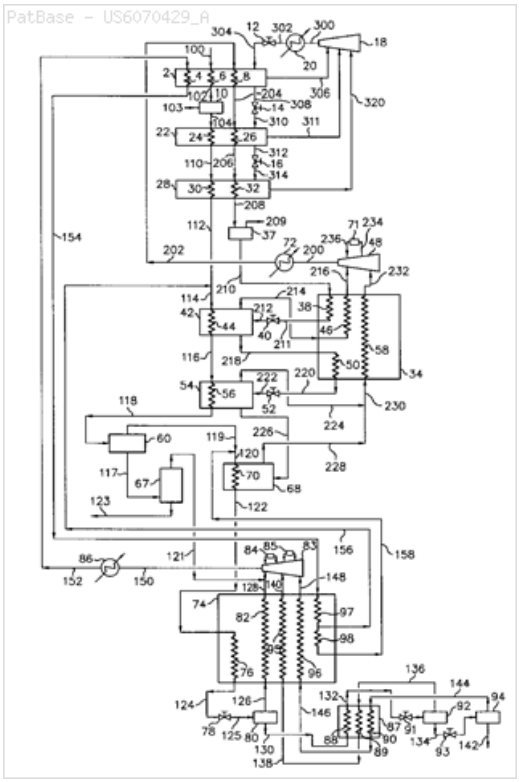
Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

14) Family number: 29446281 (US6070429A)

Title: NITROGEN REJECTION SYSTEM FOR LIQUIFIED **NATURAL** **GAS**

Abstract: This invention concerns a method and an apparatus for removing nitrogen and other low boiling point inorganic components from pressurized **LNG**-bearing streams and streams produced therefrom. The removal of such components is accomplished via a novel pressure reduction/stripping methodology thereby producing at least one low BTU nitrogen-rich **gas** stream and at least one high BTU methane-rich stream which is suitable for recycle to an open methane **cycle** **liquefaction** process and/or employment as a high quality fuel **gas**.

Classifications:
International (IPC 8-9): F25J1/02 F25J3/00 F25J3/02 (Advanced/Invention); F25J1/00 F25J3/02 (Core/Invention)
International (IPC 1-7): F25J3/00
CPC: F25J1/023 F25J2200/40 F25J2210/06 F25J3/029 F25J1/0022 F25J1/004 F25J1/0052 F25J1/021 F25J1/0265 F25J1/0284 F25J3/0209 F25J3/0233 F25J3/0257 F25J2200/08 F25J2200/70 F25J2200/78 F25J2205/02 F25J2215/04 F25J2220/64 F25J2230/08 F25J2230/60 F25J2245/02
European: F25J1/00A6 F25J1/00C2F F25J1/00C4V F25J1/02B10C3 F25J1/02Z6A6 F25J3/02 F25J3/02A2 F25J3/02C12 F25J3/02C2 F25J3/02C30H F25J3/06
US: 62/612 62/619



Family:

Publication number	Publication date	Application number	Application date
AU200040356 A1	20001016	AU20000040356	20000328
AU200040356 A5	20001016	AU20000040356	20000328
AU755215 B2	20021205	AU20000040356	20000328
BRPI0009478 A	20020219	BR2000PI09478	20000328
CA2367347 AA	20010907	CA20002367347	20000328
CA2367347 C	20040817	CA20002367347	20000328
NO20014744 A	20011123	NO20010004744	20010928
NO20014744 A0	20010928	NO20010004744	20010928
NO334275 B1	20140127	NO20010004744	20010928
US6070429 A	20000606	US19990281024	19990330
WO0058674 A1	20001005	WO2000US08144	20000328

Priority:
US19990281024 19990330 WO2000US08144 20000328

Probable Assignee: CONOCO PHILLIPS CO

Assignee(s): (std): CONOCO PHILLIPS CO ; CONOCOPHILLIPS CO ; LOW WILLIAM R ; PHILLIPS PETROLEUM CO ; YAO JAME

Assignee(s): PHILLIPS PETROLEUM COMPANY

Inventor(s): (std): JAME YAO ; LOW WILLIAM R ; WILLIAM R LOW ; YAO JAME

Agent(s): PHILLIPS ORMONDE FITZPATRICK; OSLER HOSKIN AND HARCOURT LLP

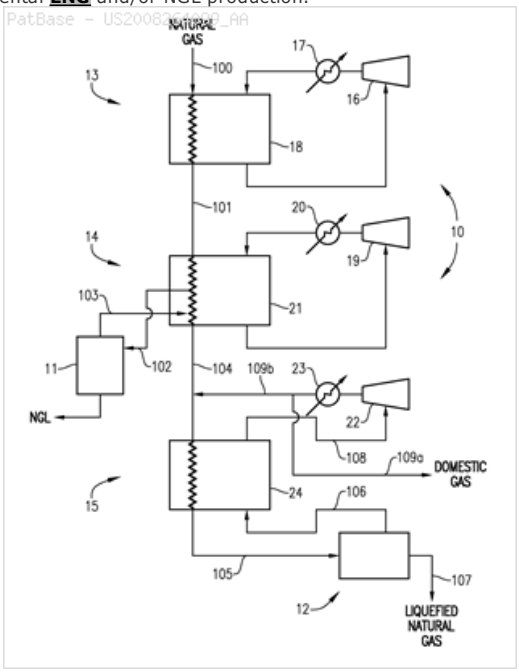
Designated states: AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BY CA CF CG CH CI CM CN CR CU CY CZ DE DK DM DZ EE ES FI FR GA GB GD GE GH GM GN GR GW HR HU ID IE IL IN IS IT JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MC MD MG MK ML MN MR MW MX NE NL NO NZ PL PT RO RU SD SE SG SI SK SL SN SZ TD TG TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW

15) Family number: 42441073 (US2008264099A)

Title: DOMESTIC **GAS** PRODUCT FROM AN **LNG** FACILITY

Abstract: An **LNG** facility capable of producing a domestic **gas** product from an intermediate stream in the **LNG** facility. Withdrawing the domestic **gas** product from a location within the **LNG** facility can minimize operational disturbances typically caused by extracting a domestic **gas** product stream upstream of the **liquefaction** portion of the **LNG** facility. In addition, withdrawing the domestic **gas** product from this location can provide increased control of light contaminants (e.g., nitrogen) in open-**loop** refrigeration **cycles** and can ultimately result in incremental **LNG** and/or NGL production.

Classifications:
International (IPC 8-9): F25J1/00 (Advanced/Invention); F25J1/00 (Core/Invention)
CPC: F25J1/0022 F25J1/004 F25J1/0052 F25J1/021 F25J1/023 F25J1/0283 F25J2220/64 F25J2245/02
European: F25J1/00A6 F25J1/00C2F F25J1/00C4V F25J1/02B10C3 F25J1/02K2C F25J1/02Z6A4 R25J220/64 R25J245/02
US: 62/611 62/611P



Family:

Publication number	Publication date	Application number	Application date
AU2008246020 AA	20081106	AU20080246020	20080319
AU2008246020 BB	20120426	AU20080246020	20080319
EG25499 A	20120122	EG20090101559	20091021
US2008264099 AA	20081030	US20070739488	20070424
WO08134136 A1	20081106	WO2008US57479	20080319

Priority:
US20070739488 20070424 WO2008US57479 20080319

Probable Assignee: CONOCO PHILLIPS CO

Assignee(s): (std): EVANS MEGAN V ; STRASSLE LISA M ; RANSBARGER WELDON L ; MOCK JON M ; ORTEGO JAMES D ; FAJARDO ELICIA ; CONOCO PHILLIPS CO ; CONOCOPHILLIPS CO

Assignee(s): CONOCOPHILLIPS COMPANY

Inventor(s): (std): STRASSLE LISA M ; RANSBARGER WELDON L ; ORTEGO JAMES D ; MOCK JON M ; FAJARDO ELICIA ; EVANS MEGAN V

Inventor(s): ELICIA FAJARDO ; JAMES D ORTEGO ; JON M MOCK ; LISA M STRASSLE ; MEGAN V EVANS ; WELDON L RANSBARGER

Agent(s): PHILLIPS ORMONDE FITZPATRICK; CONOCOPHILLIPS COMPANY - IP SERVICES GROUP, ATTENTION: DOCKETING; CONOCOPHILLIPS CO IP SERVICES GROUP ATTENTION DOCKETING; KELLY KAMERON D

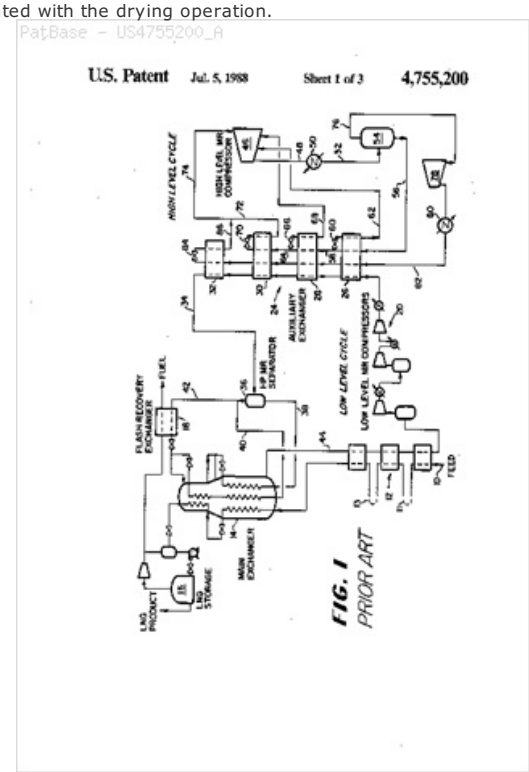
Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

16) Family number: 2810067 (US4755200A)

Title: FEED **GAS** DRIER PRECOOLING IN **MIXED** **REFRIGERANT** **NATURAL** **GAS** **LIQUEFACTION** PROCESSES

Abstract: A **closed** **loop** (100, 106, 108, 112, 116, 118) single component, e.g. propane or Freon **refrigerant**, refrigeration **cycle** is added to a single or dual **mixed** **refrigerant** **natural** **gas** **liquefaction** process to precool (in 100) the **natural** **gas** prior to adsorptive drying. By means of pressure control (104), the single component **refrigerant** temperature can be accurately controlled to ensure against hydrate formation in the **natural** **gas** feed and to maximize the precooling of the **natural** **gas** feed prior to drying. The addition of the single component refrigeration **cycle** overcomes the difficulty of controlling the precooling temperature which occurs when **cooling** by a multicomponent **refrigerant**, and thus improves plant reliability and minimizes the equipment sizes associated with the drying operation.

Classifications:
International (IPC 8-9): B01D53/26 F25J1/00 F25J1/02 F25J3/06 (Advanced/Invention);
F25J1/00 (Advanced/Non-invention);
B01D53/26 F25J1/00 (Core/Invention)
International (IPC 1-7): B01D53/26 F25J1/00 F25J1/02 F25J3/00 F25J3/06
CPC: F25J1/0022 F25J1/0055 F25J1/0087 F25J1/0216 F25J1/0263 F25J1/0279 B01D53/265 F25J1/0215 F25J1/0267 F25J1/0268 F25J1/0291 F25J1/0295 F25J2220/62 F25J2220/64 F25J2270/90 F25J2290/62
European: B01D53/26D F25J1/02D F25J1/02D4P F25J1/02D6P F25J1/02Z4H4R2 F25J1/02Z4H4R4 F25J1/02Z6J F25J1/02Z6S R25J205/02 R25J220/62 R25J220/64 R25J270/12 R25J270/18 R25J270/60 R25J270/90 R25J280/02 R25J290/62
US: 62/11 62/335 62/434 62/612



Family:

Publication number	Publication date	Application number	Application date
AU198811995 A1	19880915	AU19880011995	19880219
AU586136 B2	19890629	AU19880011995	19880219
CA1300490 A1	19920512	CA19880559502	19880222
DE3860715 D1	19901108	DE19883860715	19880219
DZ1183 A1	20040913	DZ19880000019	19880224
EP0281821 A1	19880914	EP19880102474	19880219
EP0281821 B1	19901003	EP19880102474	19880219
FR2611386 A1	19880902	FR19880002393	19880226
FR2611386 B1	19890713	FR19880002393	19880226
JP1219488 A2	19890901	JP19880040546	19880223
JP1936308 C3	19950526	JP19880040546	19880223
JP6068431 B4	19940831	JP19880040546	19880223
KR19880010302 A	19881008	KR19880002054	19880227
KR910004397 B1	19910627	KR19880002054	19880227
NO165613 B	19901126	NO19880000842	19880226
NO165613 C	19910306	NO19880000842	19880226
NO880842 A	19880829	NO19880000842	19880226
NO880842 A0	19880226	NO19880000842	19880226
US4755200 A	19880705	US19870020286	19870227

Priority:
US19870020286 19870227 CA19880559502 19880222

Probable Assignee: AIR PRODUCTS AND CHEMICALS INC

Assignee(s): (std): AIR PROD AND CHEM

Assignee(s): AIR PROD AND CHEM INC ; AIR PRODUCTS AND CHEMICALS INC ; AIR PRODUCTS AND CHEMICALS INC A CORP OF DE ; AIR PRODUCTS AND CHEMICALS INC ALLENTOWN PA US ; AIR PRODUCTS CHEMICAL INC ; LIU YU NAN ; NEWTON CHARLES LEO

Inventor(s): (std): NEWTON CHARLES L ; NEWTON CHARLES LEO ; CHIYAARUSU REO NIYUUTON ; LIU YU NAN ; YUUNAN RIYUU

Inventor(s): CHARLES LEO NEWTON ; LIU YU NAN WHITEHALL PA 18052 US ; NEWTON CHARLES LEO PANAMA CITY FL 32407 US ; YU NAN LIU

Agent(s): PIZZEYS; PIZZEYS PATENT AND TRADE MARK ATTORNEYS PTY LTD; MCFADDEN FINCHAM; OSLER HOSKIN AND HARCOURT LLP

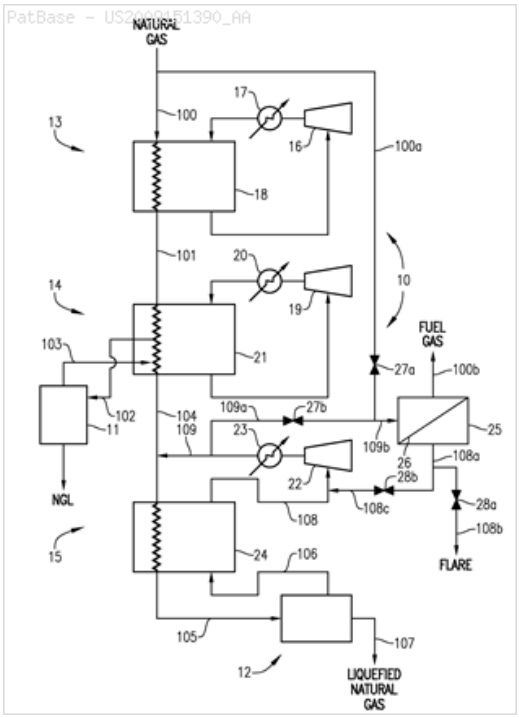
Designated states: BE DE GB IT NL

17) Family number: 43381997 (US2009151390A)

Title: SYSTEM FOR ENHANCED FUEL **GAS** COMPOSITION CONTROL IN AN **LNG** FACILITY

Abstract: An **LNG** facility employing an enhanced fuel **gas** control system. The enhanced fuel **gas** control system is operable to produce fuel **gas** having a substantially constant Modified Wobbe Index (MWI) during start-up and steady-state operation of the **LNG** facility by processing one or more intermediate process streams in a fuel **gas** **separator**. In one embodiment, the fuel **gas** **separator** employs a hydrocarbon-separating membrane, which can remove heavy hydrocarbons and/or concentrate nitrogen from the incoming process streams.

Classifications:
International (IPC 8-9): F02C7/26 F25J1/00 F25J1/02 F25J3/00 (Advanced/Invention); F25J1/00 F25J3/00 (Core/Invention)
CPC: F25J1/0022 F25J1/004 F25J1/0052 F25J1/021 F25J1/023 F25J1/0283 F25J2205/40 F25J2205/80 F25J2210/06 F25J2220/62 F25J2220/64 F25J2245/02 F25J2280/10
European: F25J1/00A6 F25J1/00C2F F25J1/00C4V F25J1/02B10C3 F25J1/02K2C F25J1/02Z6A4
US: 60/776 62/611 62/611P 62/612 62/618 62/618S



Family:

Publication number	Publication date	Application number	Application date
US2009151390 AA	20090618	US20070955141	20071212
US8381543 BB	20130226	US20070955141	20071212
WO09076501 A2	20090618	WO2008US86369	20081211
WO09076501 A3	20091126	WO2008US86369	20081211

Priority:

US20070955141 20071212

Probable Assignee: CONOCO PHILLIPS CO

Assignee(s): (std): CONOCO PHILLIPS CO ; CONOCOPHILLIPS CO ; MOCK JON M ; RANSBARGER WELDON L

Assignee(s): CONOCOPHILLIPS COMPANY

Inventor(s): (std): MOCK JON M ; RANSBARGER WELDON L

Agent(s): CONOCOPHILLIPS COMPANY - IP SERVICES GROUP,ATTENTION: DOCKETING; CONOCOPHILLIPS CO IP SERVICES GROUP ATTENTION DOCKETING; CONOCOPHILLIPS COMPANY; CONOCOPHILLIPS CO; BALL JOHN W

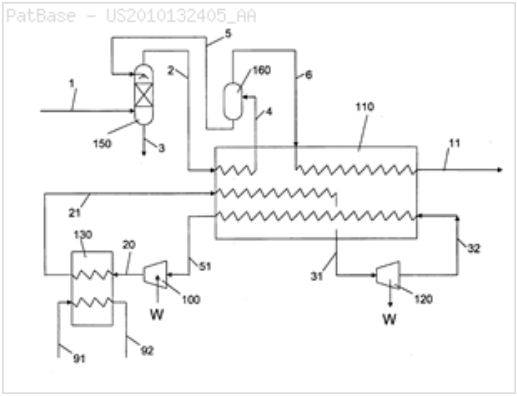
Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

18) Family number: 42904375 (US2010132405A)

Title: METHOD AND SYSTEM FOR PRODUCING **LNG**

Abstract: A method is described for production of **LNG** from an incoming feed **gas** (1) on an onshore or offshore installation, and it is characterised by the following steps: 1) the feed **gas** is led through a fractionation column (150) where it is **cooled** a separated in an overhead fraction with a reduced content of pentane (C5) and heavier components, and a bottom fraction enriched with heavier hydrocarbons, 2) the overhead fraction from the fractionation column is fed to a **heat** exchanger system (110) and is subjected to a partial condensation to form a two-**phase** fluid, and the two-**phase** fluid is separated in a suitable **separator** (160) a liquid (5) rich in LPG and pentane (C3-C5) which is re-circulated as cold reflux to the fractionation column (150), while the **gas** (6) containing lower amounts of C5 hydrocarbons and hydrocarbons heavier than C5 is exported for further processing in the **heat** exchanger system (110) for **liquefaction** to **LNG** with a maximum content of ethane and LPG 3) the **cooling** **circuit** for **liquefaction** of **gas** in the **heat** exchanger system comprises an open or **closed** **gas** **expansion** process with at least one **gas** **expansion** step. A system for carrying out the method is also described.

Classifications:
International (IPC 8-9): B01D3/14 C10L3/08 F25J1/00 F25J1/02 F25J3/02 (Advanced/Invention);
B01D3/14 C10L3/08 F25J1/02 F25J3/02 (Advanced/Non-invention);
B01D3/14 C10L3/00 F25J1/00 F25J3/02 (Core/Invention)
International (IPC 1-7): F25J3/02
CPC: F25J1/0288 F25J1/0022 F25J1/005 F25J1/0052 F25J1/0057 F25J1/0072 F25J1/0204 F25J1/0205 F25J1/0212 F25J1/0215 F25J1/0232 F25J1/0238 F25J1/0241 F25J1/0278 F25J1/0281 F25J1/0294 F25J2220/64 F25J2270/16 F25J2270/90 F25J1/0037 F25J1/0082 F25J1/0092 F25J1/0097 F25J1/0201 F25J1/0202 F25J1/0216 F25J2210/06 F25J1/02 B01D3/14 C10L3/08 F25J3/02
European: F25J1/00A6 F25J1/00C4E F25J1/00C4V F25J1/00C4V4 F25J1/00R4N F25J1/02 F25J1/02B2 F25J1/02B4 F25J1/02D F25J1/02D2 F25J1/02D4P F25J1/02F F25J1/02K4 F25J1/02K8D2 F25J1/02K8D4R F25J1/02Z4U4F F25J1/02Z6A F25J1/02Z6C4 F25J1/02Z6N R25J210/60 R25J220/64 R25J270/16 R25J270/90
US: 62/611 62/611P 62/618 62/618S



Family:

Publication number	Publication date	Application number	Application date
AU2008283102 AA	20090205	AU20080283102	20080620
AU2008283102 BB	20130207	AU20080283102	20080620
BRPI0813297 A2	20141230	BR2008PI13297	20080620
CA2692213 AA	20090205	CA20082692213	20080620
CN101711335 A	20100519	CN200880021514	20080620
CN101711335 B	20141015	CN200880021514	20080620
EP2165140 A1	20100324	EP20080779082	20080620
IN08508DN2009 A	20100716	IN2009DN08508	20091224
KR101568763 B1	20151112	KR20107001622	20080620
KR20100039353 A	20100415	KR20107001622	20080620
MY163902 A	20171115	MY20090005466	20080620
NO20073245 A	20081223	NO20070003245	20070622
NO20073245 L	20081223	NO20070003245	20070622
NO329177 B1	20100906	NO20070003245	20070622
US2010132405 AA	20100603	US20080665329	20080620
WO09017414 A1	20090205	WO2008NO00229	20080620

Priority:

NO20070003245 20070622 WO2008NO00229 20080620

Probable Assignee: ARAGON AS

Assignee(s): (std): KANFA ARAGON AS ; LUND NILSEN INGE SVERRE

Assignee(s): ARAGON AS

Inventor(s): (std): LUND NILSEN INGE SVERRE ; NILSEN INGE SVERRE LUND ; SVERRE LUND NILSEN INGE ; NILSEN LUND

Inventor(s): LUND NILSEN ; INGE SVERRE LUND NILSEN

Agent(s): WRAYS; ONSAGERS LTD; CHRISTIAN D ABEL; ACAPO AS

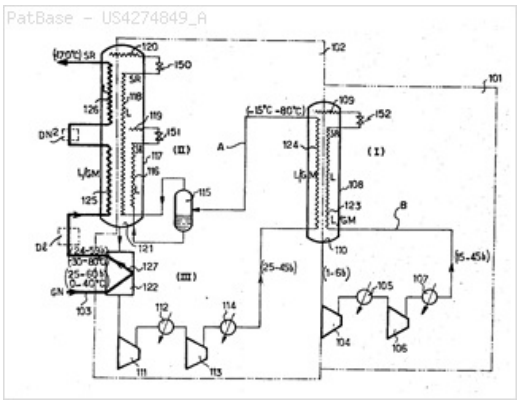
Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

19) Family number: 30771625 (US4064310A)

Title: CONDUCTOR COMPOSITIONS

Abstract: Conductor compositions of finely divided Ni3B1-xPx wherein x is the approximate range 0.05-0.6, dispersed in a vehicle, useful for producing sintered conductor patterns on a substrate. Glass powder may optionally be present. Also the resultant fired conductors.

Classifications:
International (IPC 8-9): C04B41/50 C04B41/51 C04B41/87 C04B41/88 C09D5/24 F25J1/00 F25J1/02 H01B1/06 H01B1/14 H01B1/16 H01J17/49 H05K1/09 (Advanced/Invention); F25J1/00 (Advanced/Non-invention); C04B41/45 C04B41/87 C04B41/88 C09D5/24 F25J1/00 H01B1/06 H01B1/14 H01J17/49 H05K1/09 (Core/Invention)
International (IPC 1-7): B22F7/00 C09D5/24 F25J1/00 F25J1/02 H01B1/00 H01B1/02 H01B1/06 H01B5/14 H01B5/16
CPC: Y10S428/901 C04B41/88 C04B41/009 C04B41/5025 C04B41/5053 C04B41/5144 C04B41/87 C04B2111/00844 C04B2111/94 H01B1/06 H01B1/14 H01J17/492 H05K1/092 F25J1/0262 F25J1/0265 F25J1/0022 F25J1/0055 F25J1/0212 F25J1/0264 F25J1/0268 F25J1/0292 F25J2220/64 F25J2210/06
European: C04B41/00V C04B41/50P C04B41/50R C04B41/51P C04B41/87 C04B41/88 F25J1/00A6 F25J1/00C4V2 F25J1/02D F25J1/02D2 F25J1/02Z4H4 F25J1/02Z4H4R F25J1/02Z4H4R4 F25J1/02Z6L H01B1/06 H01B1/14 H01J17/49D H05K1/09D M04B111/00T56 M04B111/94 R25J220/64
US: 106/1.27 252/513 428/427 428/433 428/901 62/335 62/612 62/9



Family:

Publication number	Publication date	Application number	Application date
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CA1102106 A1	19810602	CA19780298235	19780306
DE2549466 A1	19760526	DE19752549466	19751105
DE2809859 A1	19780914	DE19782809859	19780307
DE2809859 B2	19791115	DE19782809859	19780307
DE2809859 C3	19800731	DE19782809859	19780307
FR2292203 A1	19760618	FR19740038312	19741121
FR2292203 B1	19770325	FR19740038312	19741121
FR2383508 A1	19781006	FR19780006319	19780306
FR2383508 B1	19800912	FR19780006319	19780306
GB1515326 A	19780621	GB19750044407	19751028
GB1577302 A	19801022	GB19780008829	19780306
IT1053226 A	19810831	IT19750046944	19751121
IT1094185 A	19850726	IT19780020918	19780306
IT7820918 A0	19780306	IT19780020918	19780306
JP1170686 C3	19831017	JP19750138285	19751119
JP1349024 C3	19861128	JP19780025083	19780307
JP51074980 A2	19760629	JP19750138285	19751119
JP53110099 A2	19780926	JP19780025083	19780307
JP58001349 B4	19830111	JP19750138285	19751119
JP61015521 B4	19860424	JP19780025083	19780307
MY7900156 A	19791231	MY19790000156	19791230
NL7802424 A	19780911	NL19780002424	19780306
NZ179107 A	19780620	NZ19750179107	19751030
US4064310 A	19771220	US19770775273	19770307
US4274849 A	19810623	US19790068430	19790821

Priority:

FR19740038312 19741121 US19750626107 19751028 US19770775273 19770307
CA19780298235 19780306 US19780941925 19780913

Probable Assignee: TECHNIP CIE

Assignee(s): (std): CAMPAGNIE FRANCAISE D ETUDES E ; CIE FRANCAIS D ETUDES ET DE CO ; DU PONT ; E I DU PONT DE NEMOURS AND COMPANY TE WILMINGTON D ; DU PONT E I DE NEMOURS AND CO ; E I DU PONT DE NEMOURS CO ; TECHNIP CIE FSE ETUD CONST ; FRANCAISE D ETUDES DE COMP ; TECHNIP CIE ; TECHNIP S A COMP FRANC ET CONS ; FR D ETUDES ET DE CONSTR TECHN ; FRANC ET COMP

Assignee(s): FRANCAISE D ETUDES ET DE CONSTRUCTION TE COMP ; II AI DEYUHON DE NIMOASU ANDO CO ; PATTERSON FRANK K ; FRANCAISE D ETUDES ET DE CONSTRUCTION COMP ; PARADOWSKI HENRI ; GARIER CHRISTIAN ; EIDU PONT DE NEMOURS AND CO ; FRANCAISE D ETUDES ET DE CONSTRUCTION TECHNIP COMP SA ; FRANCAISE D ETUDES ET DE CONSTRUCTION TECHNIP COMP ; E I DU PONT DE NEMOURS AND CO ; DU PONT DE NEMOURS AND CY ; DU PONT E I DE NEMOURS AND COMPANY ; E I DU PONT DE NEMOURS AND CO WILMINGTON DEL V ST A ; E I DU PONT DE NEMOURS AND COMPANY TE WILMINGTON DELAWARE VER ST V AM ; EI DU PONT DE NEMOURS AND CO ; EI DU PONT DE NEMOURS AND CO TE WILMINGTON DELAWARE VERSTVAM ; DU PONT DE NEMOURS AND CO E ; E I DU PONT DE NEMOURS AND CO WILMINGTON DEL V ST ; E I DU PONT DE NEMOURS AND COMPANY ; COMPAGNIE FRANCAISE D ETUDES DE ; COMPAGNIE FRANCAISE D ETUDES ET DE CONSTRUCTION TECHNIP S A

Inventor(s): (std): FURANKU NORUZU PATAASON ; FURANKU NOURUZU PATAASON ; GARIER C ; HENRI PARADOWSKI ; PARADOWSKI H ; PATTERSON FRANK K ; PATTERSON FRANK KNOWLES ; PARADOWSKI HENRI ; GARIER CHRISTIAN ; PARADOWSK HENRI ; CHRISTIAN GARIER ; CHRISTIAN GARIER ET HENRI PARADOWSK

Inventor(s): CHRISTIAN GARTER HENRI PARADOWSKI ; PATTERSON FRANK KNOWLES WILMINGTON DEL V ST A ; PATTERSON FRANK KNOWLES WILMINGTON DEL VSTA ; KNOWLES PATTERSON FRANK

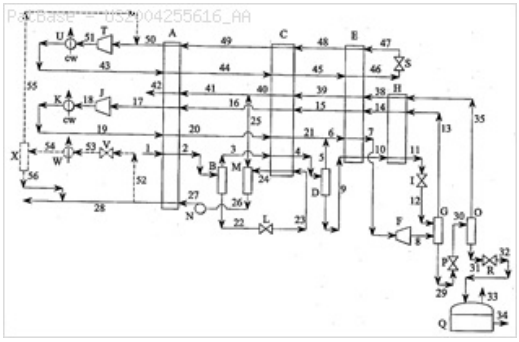
Agent(s): MCCALLUM BROOKS AND CO

20) Family number: 15720416 (US2004255616A)

Title: METHOD FOR **LIQUEFYING** METHANE-RICH **GAS**

Abstract: A method for **liquefying** methane-rich **gas** in the form of a feed **gas** comprising the steps of **cooling** the **gas** and partially **liquefying** the **gas** by **expansion** within an **expansion** device. The pressure of the **gas** at the inlet of the **expansion** device is in the range from 40 bar to 100 bar and pressure of the **gas** at the outlet of the **expansion** device is in the range from 2 bar to 10 bar.

Classifications:
International (IPC 8-9): F25J1/00 F25J1/02 (Advanced/Invention); F25J1/00 (Core/Invention)
International (IPC 1-7): F25J1/00 F25J1/02
CPC: F25J1/0022 F25J1/0035 F25J1/0037 F25J1/004 F25J1/0042 F25J1/0045 F25J1/0052 F25J1/0219 F25J1/025 F25J1/0255 F25J1/0278 F25J2205/02 F25J2205/04 F25J2220/62 F25J2220/64 F25J2235/60 F25J2240/40 F25J2245/02
European: F25J1/00A6 F25J1/00C2E F25J1/00C2E2 F25J1/00C2F F25J1/00C2L F25J1/00C2V F25J1/00C4V F25J1/02D10 F25J1/02Z2M8P F25J1/02Z2T8 F25J1/02Z4U4F R25J205/02 R25J205/04 R25J220/62 R25J220/64 R25J235/60 R25J240/40 R25J245/02
US: 62/611 62/611P 62/612 62/612S 62/613



Family:

Publication number	Publication date	Application number	Application date
GB200120272 A0	20011010	GB20010020272	20010821
GB200402650 A0	20040310	GB20040002650	20020820
GB2393504 A1	20040331	GB20040002650	20020820
GB2393504 B2	20050518	GB20040002650	20020820
US2004255616 AA	20041223	US20040487501	20040809
US7234321 BB	20070626	US20020487501	20020820
WO03019095 A1	20030306	WO2002GB03844	20020820

Priority:
GB20010020272 20010821 WO2002GB03844 20020820

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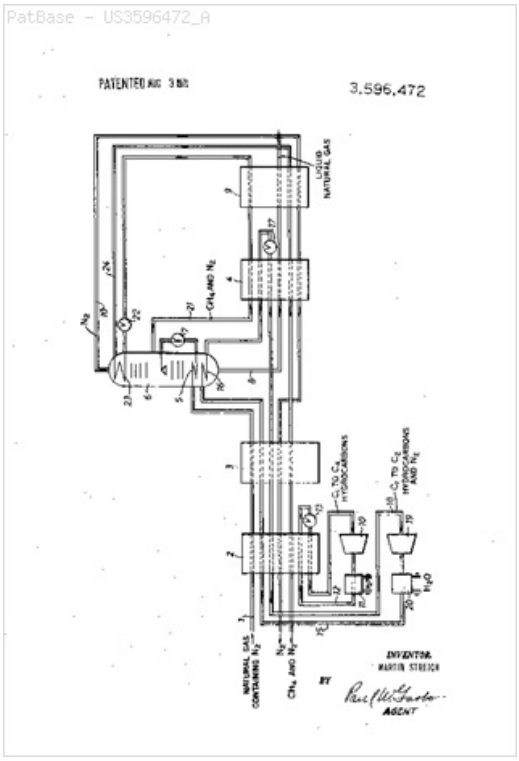
Designated states: AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE ES FI FR GA GB GD GE GH GM GN GQ GR GW HR HU ID IE IL IN IS IT JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MC MD MG MK ML MN MR MW MX MZ NE NL NO NZ OM PH PL PT RO RU SD SE SG SI SK SL SN SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW

21) Family number: 657470 (US3596472A)

Title: PROCESS FOR **LIQUEFYING** **NATURAL** **GAS** CONTAINING NITROGEN

Abstract: 1,181,049. **Natural** **gas** **liquefaction** process. MESSER GRIESHEIM G.m.b.H. 5 Dec., 1968 [20 Dec., 1967]. No. 57848/68. Heading F4P. **Cooling**, followed by **liquefaction** and **subcooling** of compressed **natural** hydrocarbon **gas** in feed line 101 is effected in **heat**-exchangers 102, 103, respectively, and the sub-**cooled** liquid is then further **cooled** at 104 and expanded at a valve 107 into a **separator** 105; exchanger 102 being **cooled** by passage therethrough of a **first** multicomponent **refrigerant**, e.g. a mixture of C 1 to C 4 saturated hydrocarbons in a **closed**, **cycle**, exchanger 103 being **cooled** by a **second** multicomponent **refrigerant**, e.g. a mixture of nitrogen, methane and ethane also in a **closed** **cycle** and in cascade arrangement with the **first** refrigeration **cycle** and the **refrigerant** of each **cycle** undergoes only one compression stage and is expanded to above atmospheric pressure. Exchanger 104 is **cooled** by flash **gas** from **separator** 105 which **gas** also **cools** exchangers 102, 103. In operation, the **first** **refrigerant** is compressed at 109 to about 40 atmosphere **liquefied** in a water-**cooled** exchanger 110, further **cooled** in exchanger 102 in countercurrent **heat** exchange with itself after **expansion** at 112 to about 3 atmosphere, and the **refrigerant** after leaving the warm end of exchanger 102 is returned to the compressor inlet. The **second** **refrigerant** is compressed at 114, **cooled** by water at 115, **liquefied** in exchanger 102, further **cooled** in exchanger 103, expanded at a valve 117 and returned through exchangers 103, 102 to the inlet of compressor 114.

Classifications:
International (IPC 8-9): F25J1/00 F25J1/02 F25J3/02 (Advanced/Invention); F25J1/00 F25J3/02 (Core/Invention)
International (IPC 1-7): F25J1/00 F25J1/02 F25J3/02 F25J3/06
CPC: Y10S62/927 F25J1/0218 F25J1/0022 F25J1/004 F25J1/0045 F25J1/0052 F25J1/0072 F25J1/0214 F25J1/0219 F25J3/0209 F25J3/0233 F25J3/0257 F25J2200/02 F25J2200/50 F25J2200/74 F25J2200/94 F25J2270/12 F25J2270/42 F25J2270/60 F25J2290/34
European: F25J1/00A6 F25J1/00C2F F25J1/00C2V F25J1/00C4V F25J1/00R4N F25J1/02D F25J1/02D10 F25J1/02D4 F25J1/02D6P F25J3/02A2 F25J3/02C12 F25J3/02C2 R25J200/02 R25J200/50 R25J200/74 R25J200/94 R25J270/12 R25J270/42 R25J270/60 R25J290/34
US: 62/28 62/623 62/927



Family:

Publication number	Publication date	Application number	Application date
DE1551611 A1	19700416	DE19671551611	19671220
DE1551611 B2	19750821	DE19671551611	19671220
DE1551611 C3	19760401	DE1967M076657	19671220
FR1596088 A	19700615		19681213
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NL160078 C	19790917	NL19680018394	19681220
NL6818394 A	19690624	NL19680018394	19681220
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US3596472 A	19710803	US19680784124	19681216

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DE19671551611 19671220 DE19671551611 19671220 DE1967M076657 19671220

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