

Search query (2): [SP]: 1. a process for recovering methane from a hydrocarbon-containing gas, the process comprising: (a) cooling and at least partially condensing a feed stream comprising the hydrocarbon-containing gas to thereby provide a cooled feed stream, wherein the hydrocarbon-containing gas comprises in the range of 0.5 to 30 mole percent of nitrogen (b) fractionating at least a portion of the cooled feed stream in a distillation column to thereby form a nitrogen-poor bottom stream and a nitrogen-rich overhead stream, wherein the fractionating occurs at a pressure in the range of 1 to 8 mpa, wherein the nitrogen-rich overhead stream comprises at least 75 percent of the nitrogen originally present in the hydrocarbon-containing gas and (c) recovering at least a portion of the nitrogen-poor bottom stream to thereby form an lng-enriched stream. 2. the process of claim 1, wherein at least a portion of the cooling in step (a) is carried out via indirect heat exchange with a single mixed refrigerant stream in a closed-loop refrigeration cycle, a dual mixed refrigerant cycle, a cascade refrigeration cycle, or a nitrogen refrigeration cycle. 3. the process of claim 1, wherein at least a portion of the cooling in step (a) is carried out via indirect heat exchange with a mixed refrigerant stream in a closed-loop refrigeration cycle. 4. the process of claim 1, further comprising, prior to the cooling of step (a), cooling the hydrocarbon-containing gas to thereby form a cooled hydrocarbon-containing gas, wherein at least a portion of the cooling is carried out via indirect heat exchange with a mixed refrigerant stream in a closed-loop refrigeration cycle. 5. the process of claim 1, wherein the lng-enriched stream comprises at least 85 percent less nitrogen than the hydrocarbon-containing gas based on mole percentage of nitrogen. 6. the process of claim 1, wherein the hydrocarbon-containing gas comprises less than 20 mole percent of nitrogen. 7. the process of claim 1, wherein the fractionating of step (b) occurs at a pressure in the range of 2 to 6 mpa. 8. the process of claim 1, wherein the lng-enriched stream comprises less than 3 mole percent of nitrogen. 9. the process of claim 1, further comprising, prior to the cooling of step (a), introducing the hydrocarbon-containing gas into a reboiler in fluid communication with the distillation column to thereby form the feed stream in step (a). 10. the process of claim 1, further comprising, prior to the cooling of step (a), pretreating the hydrocarbon-containing gas to form a treated hydrocarbon-containing gas, wherein the treated hydrocarbon-containing gas is the hydrocarbon-containing gas in step (a). 11. the process of claim 1, wherein the recovering of step (c) comprises cooling at least a portion of the nitrogen-poor bottom stream to form the lng-enriched stream, wherein at least a portion of the cooling is carried out via indirect heat exchange with a mixed refrigerant stream in a closed-loop refrigeration cycle. 12. a process for recovering methane from a hydrocarbon-containing gas, the process comprising: (a) cooling and at least partially condensing a feed stream comprising the hydrocarbon-containing gas to thereby provide a cooled feed stream, wherein the hydrocarbon-containing gas comprises in the range of 0.5 to 30 mole percent of nitrogen (b) fractionating at least a portion of the cooled feed stream in a distillation column to thereby form a nitrogen-poor bottom stream and a nitrogen-rich overhead stream, wherein the nitrogen-rich overhead stream comprises at least 75 percent of the nitrogen originally present in the hydrocarbon-containing gas (c) cooling at least a portion of the nitrogen-rich overhead stream to thereby form a cooled nitrogen-rich overhead stream (d) separating the cooled nitrogen-rich overhead stream into a liquid reflux stream and a vapor byproduct (e) introducing at least a portion of the liquid reflux stream into the distillation column and (f) cooling at least a portion of the nitrogen-poor bottom stream to thereby form an lng-enriched stream. 13. the process of claim 12, wherein at least a portion of the cooling in step (a), step (c), and step (f) is carried out via indirect heat exchange with a single mixed refrigerant stream in a closed-loop refrigeration cycle, a dual mixed refrigerant cycle, a cascade refrigeration cycle, or a nitrogen refrigeration cycle. 14. the process of claim 12, wherein at least a portion of the cooling in step (a), step (c), and step (f) is carried out via indirect heat exchange with a mixed refrigerant stream in a closed-loop refrigeration cycle. 15. the process of claim 12, further comprising, prior to the cooling of step (a), cooling the hydrocarbon-containing gas to thereby form a cooled hydrocarbon-containing gas, wherein at least a portion of the cooling is carried out via indirect heat exchange with a mixed refrigerant stream in a closed-loop refrigeration cycle. 16. the process of claim 12, wherein the lng-enriched stream comprises at least 85 percent less nitrogen than the hydrocarbon-containing gas based on mole percentage of nitrogen. 17. the process of claim 12, wherein the fractionating of step (b) occurs at a pressure in the range of 2 to 6 mpa. 18. the process of claim 12, wherein the lng-enriched stream comprises less than 3 mole percent of nitrogen. 19. the process of claim 12, further comprising, prior to the cooling of step (a), pretreating the hydrocarbon-containing gas to form a treated hydrocarbon-containing gas, wherein the treated hydrocarbon-containing gas is the hydrocarbon-containing gas in step (a). 20. the process of claim 12, further comprising, prior to the cooling of step (a), introducing the hydrocarbon-containing gas into a reboiler in fluid communication with the distillation column to thereby form the feed stream in step (a). 21. a facility for recovering liquid methane gas (lng) from a hydrocarbon-containing gas, the facility comprising: a primary heat exchanger having a first cooling pass disposed therein, wherein the first cooling pass is configured to cool the hydrocarbon-containing gas into a cooled hydrocarbon-containing gas a distillation column in fluid communication with the first cooling pass, wherein the distillation column comprises a first inlet to receive the cooled hydrocarbon-containing gas, wherein the distillation column is configured to separate the cooled hydrocarbon-containing gas into a nitrogen-rich overhead stream and a nitrogen-poor bottom stream a second cooling pass disposed within the primary heat exchanger in fluid communication with the distillation column, wherein the second cooling pass is configured to cool the nitrogen-poor bottom stream into an lng-enriched liquid stream a third cooling pass disposed within the primary heat exchanger in fluid communication with the distillation column, wherein the third cooling pass is configured to cool the nitrogen-rich overhead stream into a cooled nitrogen-rich stream a reflux system in fluid communication between the third cooling pass and the distillation column, wherein the reflux system is configured to separate the cooled nitrogen-rich stream into a liquid reflux stream and a vapor byproduct and a single closed-loop mixed refrigeration cycle at least partially disposed within the primary heat exchanger. 22. the facility of claim 21, further comprising a reboiler in fluid communication with the first cooling pass, wherein the reboiler is configured to cool the hydrocarbon-containing gas prior to being introduced into the first cooling pass. 23. the facility of claim 22, wherein the reboiler is in fluid communication with the distillation column and is configured to provide heat media to the distillation column. 24. the facility of claim 21, wherein the reflux system comprises a condenser drum for separating the cooled nitrogen-rich stream into the liquid reflux stream and the vapor byproduct. 25. the facility of claim 21, wherein the reflux system comprises a reflux pump configured to pump the liquid reflux into the distillation column. 26. the facility of claim 21, wherein the liquid reflux stream is introduced into the distillation column via a second inlet, wherein the second inlet is positioned at a higher point relative to the first inlet.

Results: 11

1) Family number: 61267601 (US2015377551A)

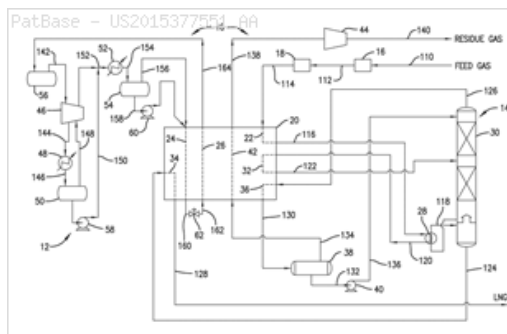
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Title: PROCESS AND SYSTEM FOR REMOVING NITROGEN FROM LNG

Abstract: Processes and systems are provided for removing nitrogen from a hydrocarbon-containing gas to thereby recover a liquid natural gas (LNG) stream. In particular, the processes and systems described herein can be used to efficiently separate methane from nitrogen, which is an undesirable byproduct found in many hydrocarbon-containing gases used to produce LNG. The processes and systems described herein can utilize various refrigerant systems to separate and produce the LNG.

Classifications:

International (IPC 8-9): F25J3/00 F25J3/02 (Advanced/Invention)
CPC: F25J3/0257 F25J3/0209 F25J3/0233 F25J2200/02 F25J2200/74
 F25J2215/04 F25J2270/12 F25J2270/66 F25J2290/34

US: 62/620**Family:**

Publication number	Publication date	Application number	Application date
AR101018 AA	20161116	AR2015P102073	20150629
AU2015284592 AA	20160107	AU20150284592	20150623
BR112016029960 A2	20170822	BR20161129960	20150623
CA2952820 AA	20161216	CA20152952820	20150623
CN106662393 A	20170510	CN201580035442	20150623

CO20170000217 A2	20170331	CO20170000217	20170111
ID201802792 A	20180316	ID2017AID00538	20150623
MX2016016721 A1	20171102	MX20160016721	20150623
US2015377551 AA	20151231	US20140320149	20140630
WO16003701 A1	20160107	WO2015US37126	20150623

Priority:

US20140320149 20140630 WO2015US37126 20150623

Probable Assignee: BLACK AND VEATCH CORP

Assignee(s): (std): BLACK AND VEATCH CORP ; BLACK AND VEATCH HOLDING CO

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Inventor(s): (std): HAO JIANG ; JIANG HAO

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Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN 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 IR 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 PA PE PG PH PL PT QA RO RS RU RW SA 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

2) Family number: 11208298 (US5505049A)

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Title: Process for removing nitrogen from LNG

Abstract: A process for removing nitrogen from liquefied natural gas (LNG) using an enhanced surface, reflux heat exchanger is disclosed. A relatively warm high pressure LNG stream is directed countercurrently in heat exchange with a cool low pressure LNG stream to chill the high pressure stream and partially vaporize the low pressure LNG stream in the reflux heat exchanger. Vapor produced thereby strips the low pressure LNG stream of nitrogen. The cool low pressure LNG stream is produced by expansion of the chilled high pressure LNG stream. Vapor produced by the expansion is combined with the vapor produced in the exchanger and withdrawn overhead. Product LNG which is lean in nitrogen is withdrawn from the bottom of the exchanger.

Classifications:

International (ipc 8-9): C10L3/10 F25J3/02

F25J3/06 (Advanced/Invention);

F25J3/02 F25J3/06 (Advanced/Non-invention);

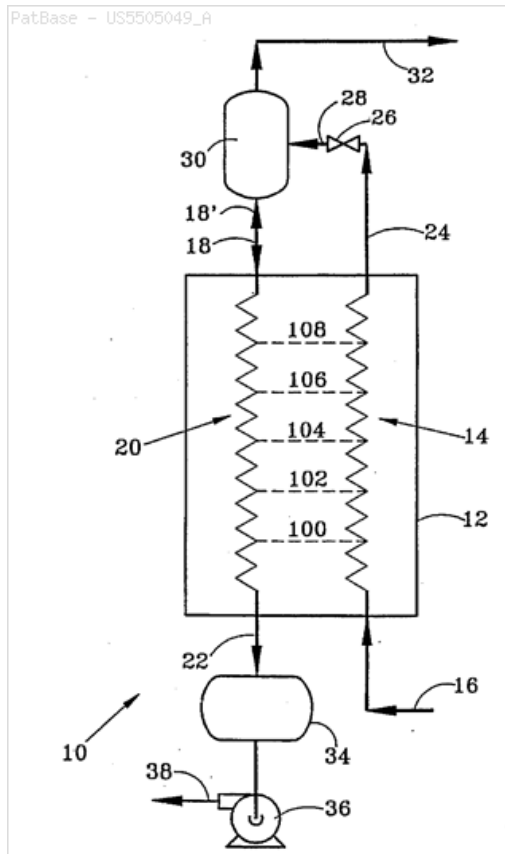
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US: 62/11 62/41 62/619 62/627



Family:

Publication number	Publication date	Application number	Application date
CN1098447 C	20030108	CN19961006235	19960509
CN1158977 A	19970910	CN19961006235	19960509
EP0742415 A2	19961113	EP19960107127	19960506
EP0742415 A3	19970709	EP19960107127	19960506
EP0742415 B1	20000802	EP19960107127	19960506
ES2094715 T1	19970201	ES19960107127T	19960506
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GR960300076 T1	19961231	GR19960300076T	19961231
JP3837182 B2	20061025	JP19960113309	19960508
JP8302367 A2	19961119	JP19960113309	19960508
KR100399458 B1	20031224	KR19960015112	19960508
KR19960041990 A	19961219	KR19960015112	19960508

CN101650112 A	20100217	CN200810145954	20080814
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US2009205367 AA	20090820	US20080069962	20080215
US9243842 BB	20160126	US20080069962	20080215
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Priority:

US20080069962 20080215

Probable Assignee: BLACK AND VEATCH HOLDING CO

Assignee(s): (std): BLACK AND VEATCH CORP ; BLACK AND VEATCH CORP US ; PRICE BRIAN C

Assignee(s): BLACK AND VEATCH HOLDING CO

Inventor(s): (std): PRICE BRIAN C

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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

6) Family number: 43983348 (US2009277217A)

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Title: ENHANCED NITROGEN REMOVAL IN AN LNG FACILITY

Abstract: An LNG facility employing an enhanced nitrogen removal system that concentrates the amount of nitrogen in the feed stream to a nitrogen removal unit (NRU) to thereby increase the separation efficiency of the NRU. In one embodiment, the nitrogen removal system comprises a multistage separation vessel operable to separate nitrogen from a cooled natural gas stream. At least a portion of the resulting nitrogen-containing stream exiting the multistage separation vessel can be used as a refrigerant, processed to a nitrogen removal unit, and/or utilized as fuel gas for the LNG facility.

Classifications:

International (IPC 8-9): F25J1/00 F25J1/02 F25J3/00

F25J3/02 (Advanced/Invention);

F25J1/00 F25J3/00 F25J3/02 (Core/Invention)

CPC: F25J3/0209 F25J1/0022 F25J1/004 F25J1/0052 F25J1/021

F25J1/023 F25J1/0238 F25J1/0241 F25J1/0265 F25J1/0283

F25J3/0233 F25J3/0257 F25J2200/02 F25J2200/40 F25J2200/70

F25J2200/78 F25J2215/04 F25J2220/62 F25J2220/64 F25J2270/12

F25J2270/88

European: F25J1/00A6 F25J1/00C2F F25J1/00C4V F25J1/00R6E

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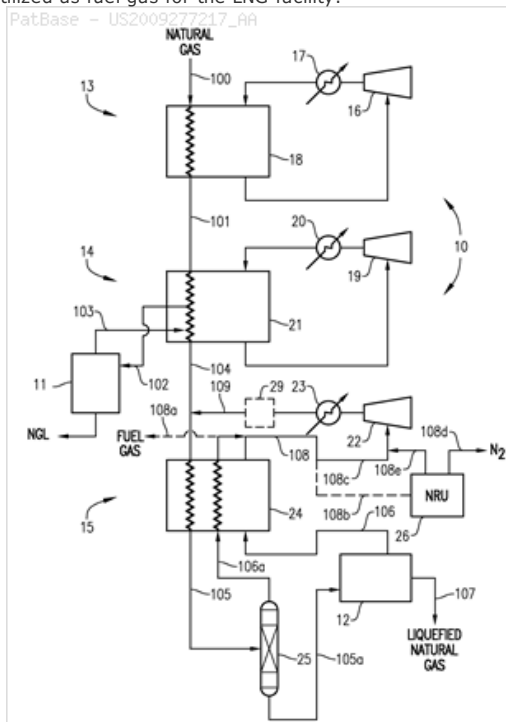
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US: 62/612 62/612P 62/613 62/613S 62/619 62/619S 62/623

62/623S 62/902 62/902S



Family:

Publication number	Publication date	Application number	Application date
AU2009244713 AA	20091112	AU20090244713	20090319
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CA2719647 AA	20091112	CA20092719647	20090319
CA2719647 C	20131210	CA20092719647	20090319
MY163765 A	20171031	MY20100004435	20090319
RU2010150141 A	20120620	RU20100150141	20090319
RU2502026 C2	20131220	RU20100150141	20090319
US2009277217 AA	20091112	US20080117364	20080508
US9528759 BB	20161227	US20080117364	20080508
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Priority:

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Probable Assignee: CONOCO PHILLIPS CO

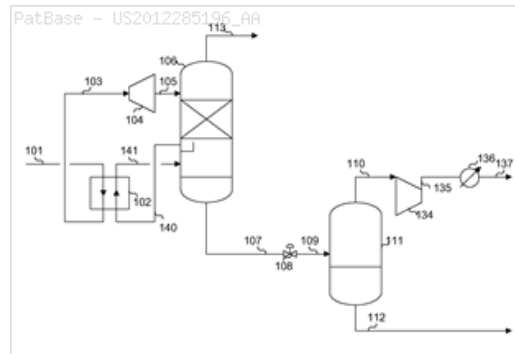
Assignee(s): (std): CONOCO PHILLIPS CO ; CONOCOPHILLIPS CO ; KONOKOPHILLIPS KOMPANI ; ORTEGO DALE J ; RANSBARGER WELDON L ; ORTEGO JR J DALE

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Inventor(s):	WELDON L RANSBARGER ; DALE J ORTEGO
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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 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 UZ VC VN ZA ZM ZW

Abstract: The present application is concerned with processes and apparatuses for the separation of nitrogen from liquefied natural gas feeds. The processes comprise the steps of: (i) cooling the feed and passing the feed to a fractionation column; (ii) withdrawing from the fractionation column an overhead vapour stream having an enriched nitrogen content, and a liquid stream having a reduced nitrogen content; (iii) dividing the overhead vapour stream from step (ii) into at least first and second overhead streams; (iv) compressing, cooling and at least partially condensing at least the first overhead stream from step (iii); and (v) expanding the stream from step (iv) and passing the expanded stream to the fractionation column as reflux, wherein cooling in step (iv) is provided, at least in part, by heat exchange with one or more streams from the fractionation column.

US: 62/620

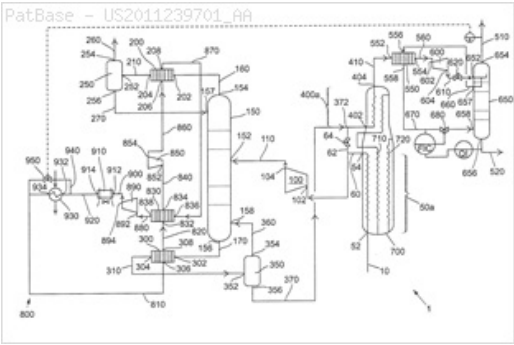
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AU2016244250 AA	20161103	AU20160244250	20161012
EP2507567 A2	20121010	EP20100787542	20101130
GB200920947 A0	20100113	GB20090020947	20091130
GB2462555 A1	20100217	GB20090020947	20091130
GB2462555 B2	20110413	GB20090020947	20091130
US2012285196 AA	20121115	US20100511780	20101130
WO11064605 A2	20110603	WO2010GB51997	20101130
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Classifications:

International (IPC 8-9): C10L3/10 F25J1/02 F25J3/02 F25J3/08 (Advanced/Invention); F25J1/00 F25J3/02 (Core/Invention)
CPC: F25J1/023 F25J1/0255 F25J3/0233 F25J1/0022 F25J1/0037 F25J1/0042 F25J1/005 F25J1/0052 F25J1/0055 F25J1/0072 F25J1/0218 F25J1/0219 F25J1/0239 F25J1/0267 F25J1/0274 F25J3/0209 F25J3/0257 F25J2200/02 F25J2200/04 F25J2200/40 F25J2200/50 F25J2200/70 F25J2200/74 F25J2205/02 F25J2210/06 F25J2215/04 F25J2240/30 F25J2270/14 F25J1/0045 F25J2240/40
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US: 62/620 62/620P



Family:

Publication number	Publication date	Application number	Application date
AU2009319191 AA	20100603	AU20090319191	20091102
AU2009319191 BB	20130502	AU20090319191	20091102
CA2741970 AA	20100603	CA20092741970	20091102
CN102713479 A	20121003	CN200980142822	20091102
EP2342517 A2	20110713	EP20090744404	20091102
JP2012514050 T2	20120621	JP20110533751T	20091102
US2011239701 AA	20111006	US20090126476	20091102
WO10060735 A2	20100603	WO2009EP64423	20091102
WO10060735 A3	20120830	WO2009EP64423	20091102

Priority:

EP20080168159 20081103 EP20090744404 20091102 WO2009EP64423 20091102

Probable Assignee: SHELL OIL CO

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Assignee(s): SHELL INT RESEARCH MIJ BV ; SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B V ; SHELL OIL CO

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Inventor(s): MARCO DICK JAGER

Agent(s): SPRUSON AND FERGUSON; NORTON ROSE OR SENCRL SRL LLP; KAWAGUTI AND PARTNERS

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

9) Family number: 49812391 (US2011289963A)

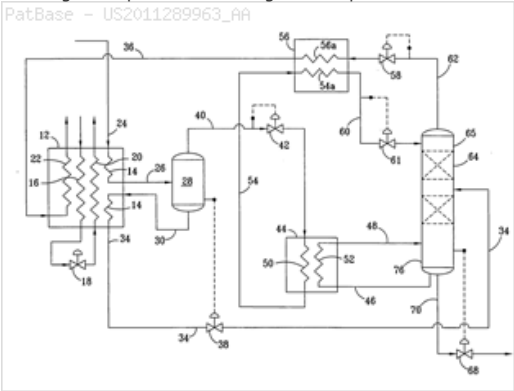
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Title: PROCESS FOR SEPARATING NITROGEN FROM A NATURAL GAS STREAM WITH NITROGEN STRIPPING IN THE PRODUCTION OF LIQUEFIED NATURAL GAS

Abstract: A mixed single refrigerant process for separating a nitrogen gas stream from a natural gas stream containing nitrogen to produce a nitrogen gas stream from a liquefied natural gas stream wherein the separated nitrogen gas stream is used as a refrigerant for the natural gas stream and wherein the mixed refrigerant provides cooling for the process.

Classifications:

International (IPC 8-9): C10L3/10 F25J3/00 F25J3/02 (Advanced/Invention)
CPC: C10L3/105 F25J1/0047 F25J3/0209 F25J3/0233 F25J3/0257 F25J2200/02 F25J2200/04 F25J2200/70 F25J2200/78 F25J2205/04 F25J2210/06 F25J2215/04 F25J2220/62 F25J2260/20 F25J2270/12 F25J2270/66
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US: 62/620 62/620P



Family:

Publication number	Publication date	Application number	Application date
CN102220176 A	20111019	CN201010232444	20100716
CN102220176 B	20160330	CN201010232444	20100716
US2011289963 AA	20111201	US20100799061	20100416

Priority:

US20100799061 20100416

Probable Assignee: BLACK AND VEATCH HOLDING CO

Assignee(s): (std): BLACK AND VEATCH CORP ; PRICE BRIAN C

Assignee(s): BLACK AND VEATCH HOLDING CO

Inventor(s): (std): PRICE B C ; PRICE BRIAN C

Abstract: A method for integrating a liquefied natural gas liquefier system with production of liquefied natural gas from a methane-containing gas stream. The liquefied natural gas is produced by feeding a methane-containing gas stream through a heat exchanger to a distillation column and liquefying the natural gas while capturing the gaseous nitrogen. The liquefied natural gas is captured and the nitrogen gas is recovered, fed through the heat exchanger to recover cold and purified.

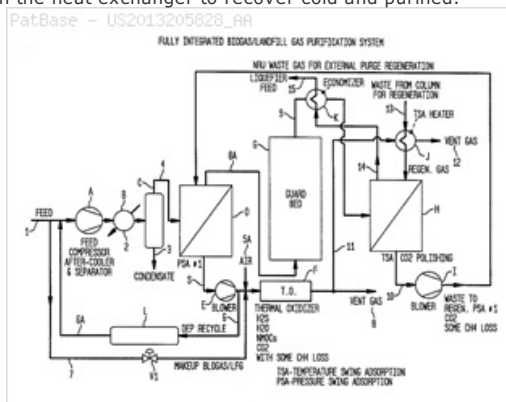
International (IPC 8-9): B01D53/047 F25J1/00 (Advanced/Invention)

F25J3/0209 F25J3/0233 F25J3/0257 F25J2200/02 F25J2200/70

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US: 62/607 62/611 95/96 95/97 95/98



Publication number	Publication date	Application number	Application date
US2013205828 AA	20130815	US20120626133	20120925
US2014318177 AA	20141030	US20140327739	20140710
WO13052325 A1	20130411	WO2012U57209	20120926

US20110543863P 20111006 US20120626133 20120925 US20140327739 20140710

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Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN 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 PA PE PG PH PL PT QA RS RU RW SC SD SE SG SI SK
SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG UY UZ VC VN ZA ZM ZW

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.

International (IPC 8-9): F25J1/00 F25J1/02

F25J3/02 (Advanced/Invention);

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

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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 F25J1/00C4

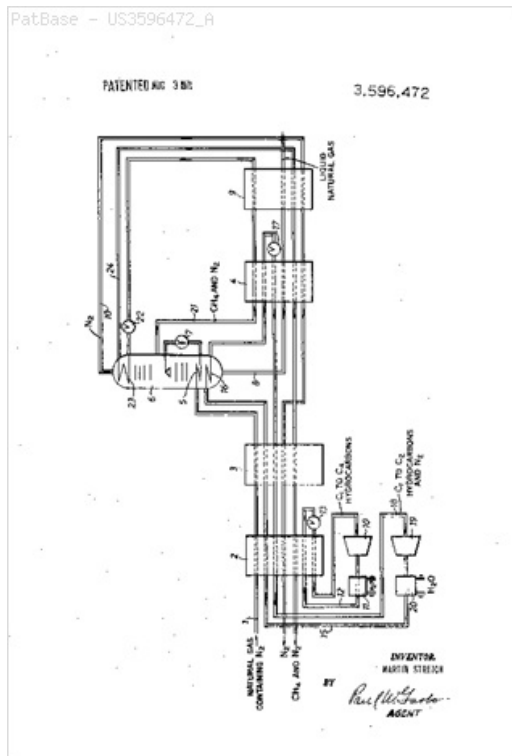
F25J1/00R4N F25J1/02D F25J1/02D10 F25J1/02D4 F25J1/02D6P

F25J3/02A2 F25J3/02C12 F25J3/02C2 R25J200/02 R25J200/50

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**Family:**

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DE1551611 A1	19700416	DE19671551611	19671220
DE1551611 B2	19750821	DE19671551611	19671220
DE1551611 C3	19760401	DE1967M076657	19671220
FR1596088 A	19700615		19681213
GB1181049 A	19700211	GB19680057848	19681205
GB1208196 A	19701007	GB19680057849	19681205
NL160078 B	19790417	NL19680018394	19681220
NL160078 C	19790917	NL19680018394	19681220
NL6818394 A	19690624	NL19680018394	19681220
SU476766 D	19750705	SU19681290780	19681218
US3596472 A	19710803	US19680784124	19681216

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