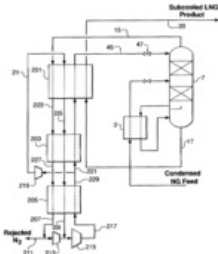
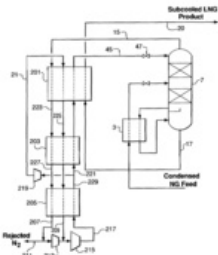
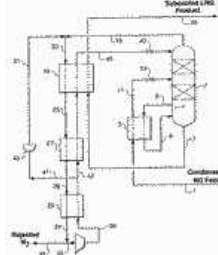
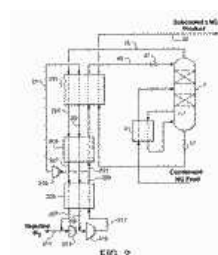
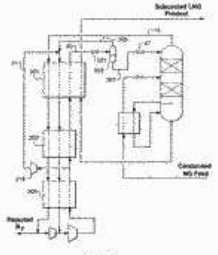
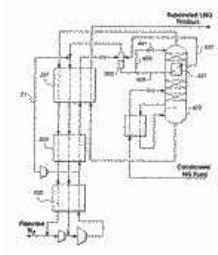
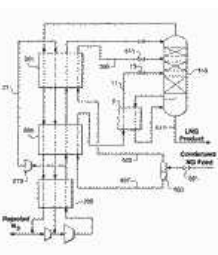
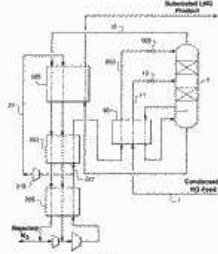
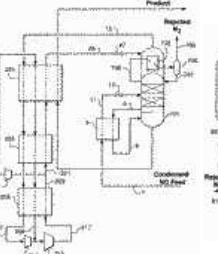
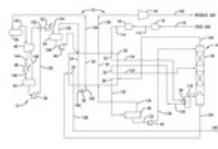
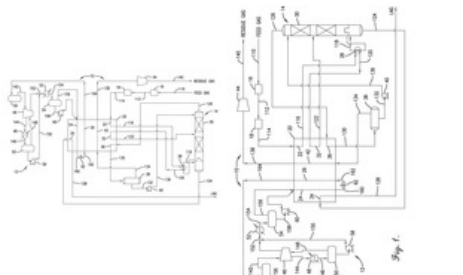
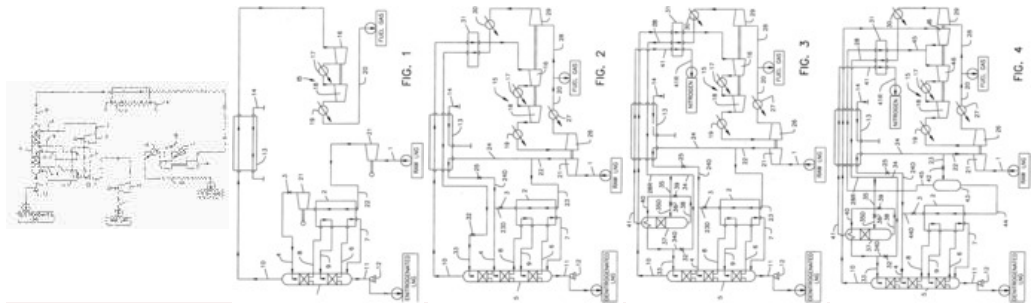
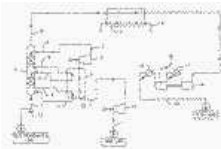


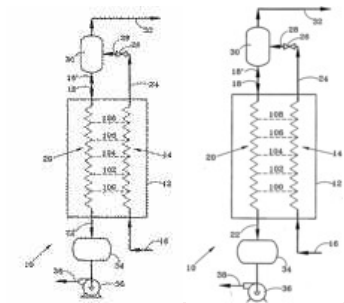
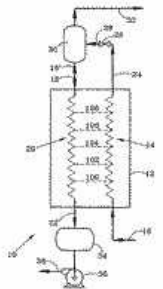
24 results for (liquid natural gas and removing nitrogen and methane and distillation column)/TI/AB/IW/CLMS/DESC/ODES/OBJ/TX - Collection: FAMPAT

#	Title	Publication number	1st App. date	Applicant/Assignee	1st Publ. date	Publ. date
1.	Nitrogen rejection from condensed natural gas	NO20042098	2003-05-22	AIR PRODUCTS & CHEMICALS* EHR PRODAKTS EHND KEMIKALZ INK	2004-11-23	2004-11-23
Method for the rejection of nitrogen from condensed natural gas which comprises (a) introducing the condensed natural gas into a distillation column at a first location therein, withdrawing a nitrogen-enriched overhead vapor stream from the distillation column, and withdrawing a purified liquefied natural gas stream from the bottom of the column; (b) introducing a cold reflux stream into the distillation column at a second location above the first location, wherein the refrigeration to provide the cold reflux stream is obtained by compressing and work expanding a refrigerant stream comprising nitrogen; and (c) either (1) cooling the purified liquefied natural gas stream or cooling the condensed natural gas stream or (2) cooling both the purified liquefied natural gas stream and the condensed natural gas stream, wherein refrigeration for (1) or (2) is obtained by compressing and work expanding the refrigerant stream comprising nitrogen. The refrigerant stream may comprise all or a portion of the nitrogen-rich vapor stream from the distillation column.						
						
						
						
						
						
						
						
						
						
2.	Process and system for removing nitrogen from lng	US2015377551	2014-06-30	BLACK & VEATCH HOLDING*	2015-12-31	2015-12-31
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.						
						
						

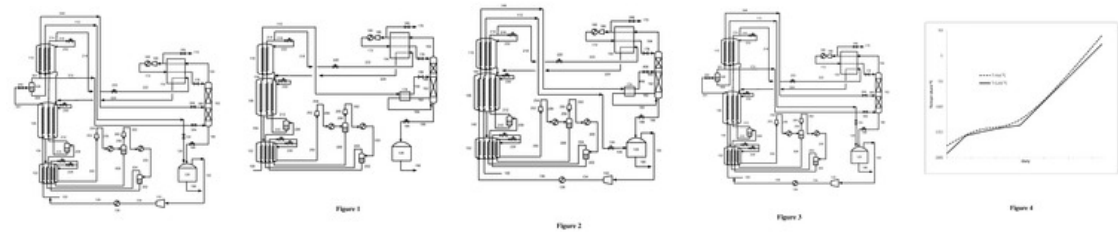
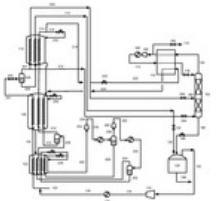
3.	Method of denitrogenating a charge of a hydrocarbon mixture consisting mainly of methane and containing at least 2 % mol nitrogen	CA2099003	1991-10-23	ELF AQUITAINE* ELF AQUITAINE EXPLORATION PRODUCTION	1993-04-24 1993-04-24
The charge of LNG (1) is refrigerated by primary expansion in a turbine (21), direct heat exchange (2) and secondary static expansion (3). The refrigerated charge (4) is fractionated in a denitrogenation column (5) in a gas phase (10) consisting of nitrogen and methane, discharged at the head of the column (5), and into a denitrogenated LNG flow (11) drawn off from the bottom of said column. A first fraction (6) and a second fraction (8) of LNG are taken from the column (5), pass through the heat exchanger (2) to refrigerate the charge (1), and are then reinjected into the column as first (7) and second (9) reboiling fractions. After recovery of its negative calories (13), the gas fraction (10) is compressed (15) to form a flow (20) of combustible gas.					

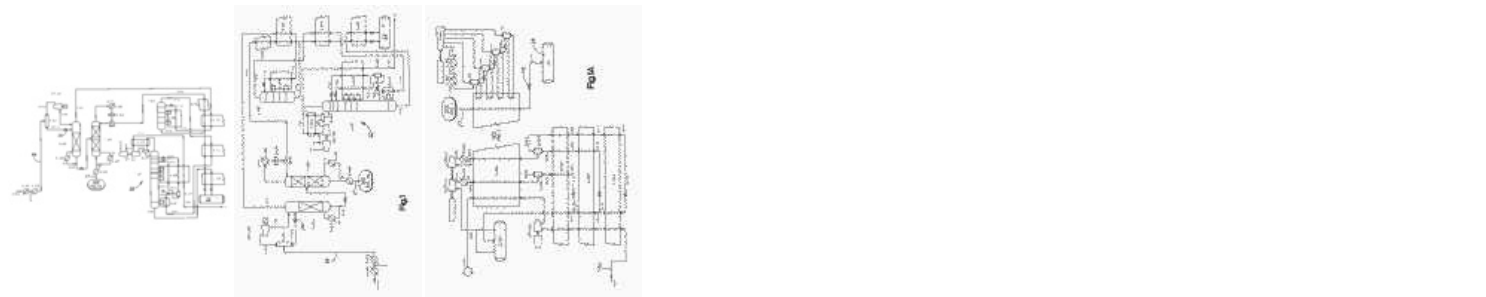


4.	Process for removing nitrogen from lng	US5505049	1995-05-09	KELLOGG BROWN & ROOT* MW KELLOGG	1996-04-09 1996-04-09
A nitrogen removal process for a natural gas liquefaction plant removes nitrogen from a relatively warm high pressure liq. stream contg. at least 80 mole% methane and up to 20 mole% nitrogen. The process comprises: (a) cooling the liq. stream in an enhanced surface heat exchanger against relatively low pressure liquefied natural gas (LNG) stream to form a relatively cool high pressure liq. stream and partially vaporise the low pressure LNG stream, (b) expanding the relatively cool high pressure liq. stream from (a) to form further cooled mixt. of liq. and vapour, (c) feeding the mixt. from (b) to a separator to form a liq. stream and a vapour stream, (d) supplying the liq. stream from (c) to the heat exchanger in (a) as the relatively low pressure stream which is partially vaporised to form a fluid of enhanced nitrogen content and a liq. prod. stream lean in nitrogen, (e) countercurrently contacting the low pressure LNG stream in the heat exchanger with the fluid vaporised in the heat exchanger to strip nitrogen, (f) supplying the fluid vaporised in the heat exchanger to the separator in (c) and (g) recovering the vapour stream from the separator, the vapour stream being enriched in nitrogen content.					



5.	Integrated nitrogen removal in the production of liquefied natural gas using refrigerated heat pump	BR102015009191	2014-04-24	AIR PRODUCTS & CHEMICALS*	2015-05-05 2015-05-05
A method for liquefying a natural gas feed stream and removing nitrogen therefrom, the method comprising passing a natural gas feed stream through a main heat exchanger to produce a first LNG stream, and separating a liquefied or partially liquefied natural gas stream in a distillation column to form nitrogen-rich vapor product, wherein a closed loop refrigeration system provides refrigeration to the main heat exchanger and to a condenser heat exchanger that provides reflux to the distillation column.					



6.	Separating nitrogen from methane in the production of lng	US2003177786	2003-02-14	CHART*	2003-09-25	2003-09-25
Substantially all the nitrogen is removed from natural gas during the production of LNG, without producing mixed nitrogen/methane streams needing recycle and further processing, or requiring compression for burning as fuel, by operating both the high pressure and the low pressure multistage distillation towers of a two column cryogenic nitrogen rejection unit to produce acceptable liquefied natural gas as tower bottom products, while the low pressure tower is further operated to produce as an overhead a gas stream containing no more than about 1% methane for safe venting to the atmosphere.						
						

7.	Method and plant for simultaneous production of a natural gas for liquefaction and a liquid cut from natural gas	FR2855526	2003-06-02	TECHNIP FRANCE* TOTAL*	2004-12-03	2004-12-03
The method comprises the following steps:(a) introduction of the feed natural gas (101) into a first distillation column (31) which gives a pre-treated natural gas (111) as top product, said pre-treated natural gas (111) being practically free of hydrocarbons of C6+, (b) the pre-treated natural gas (111) is introduced into a liquid natural gas recovery unit (19), comprising at least one second distillation column (49), to produce as top product a purified natural gas (151) and a liquid natural gas cut (15) and (c) the natural gas for liquefaction (161) is formed by the purified natural gas (151) from step (b).						
						

8.

Integrated nitrogen removal in the production of liquefied natural gas using dedicated reinjection circuit

BR102015008707

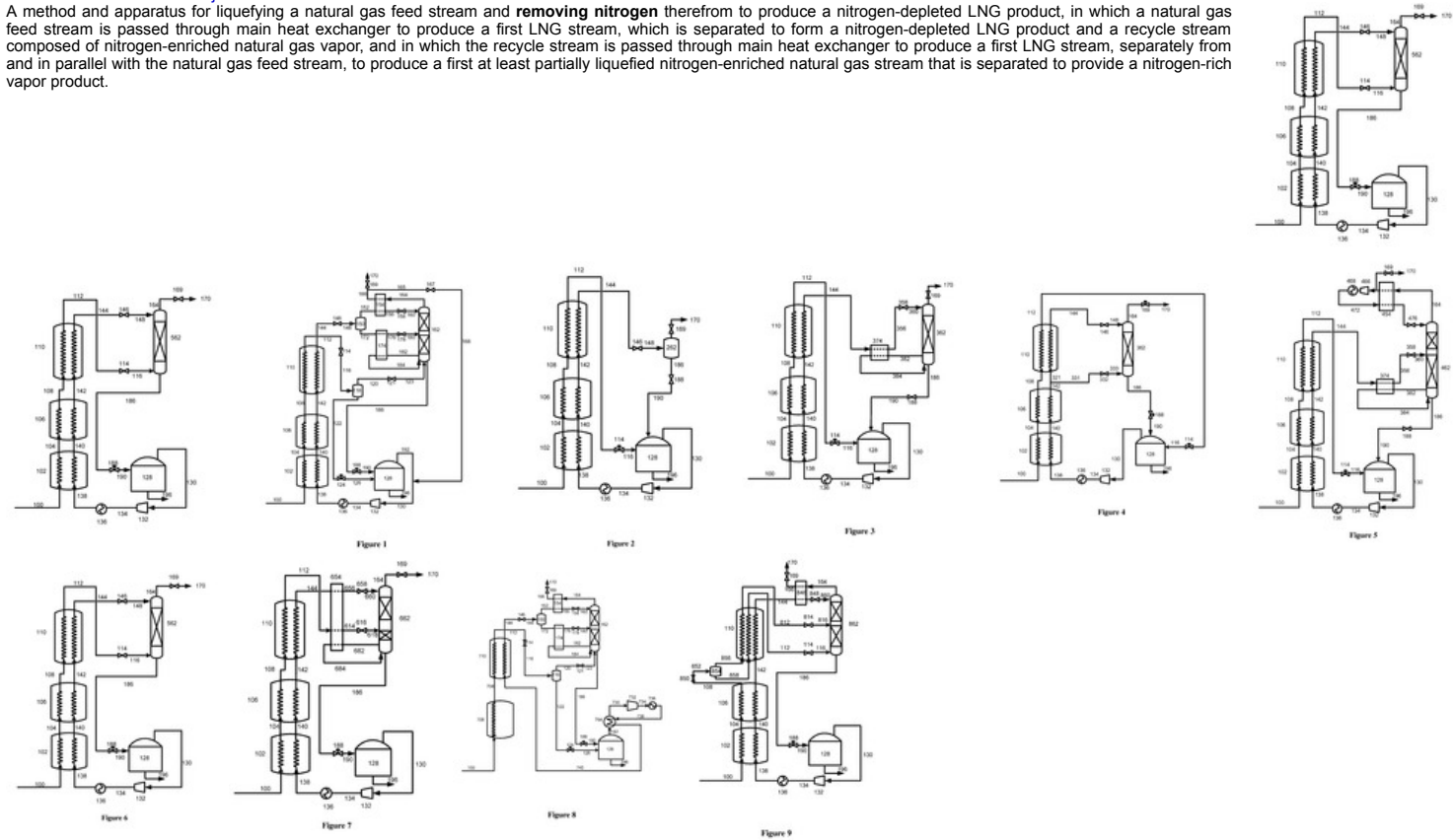
2014-04-24

AIR PRODUCTS & CHEMICALS*

2015-04-28

2015-04-28

A method and apparatus for liquefying a natural gas feed stream and removing nitrogen therefrom to produce a nitrogen-depleted LNG product, in which a natural gas feed stream is passed through main heat exchanger to produce a first LNG stream, which is separated to form a nitrogen-depleted LNG product and a recycle stream composed of nitrogen-enriched natural gas vapor, and in which the recycle stream is passed through main heat exchanger to produce a first LNG stream, separately from and in parallel with the natural gas feed stream, to produce a first at least partially liquefied nitrogen-enriched natural gas stream that is separated to provide a nitrogen-rich vapor product.



9.

Integrated nitrogen removal in the production of liquefied natural gas using intermediate feed gas separation

BR102015008692

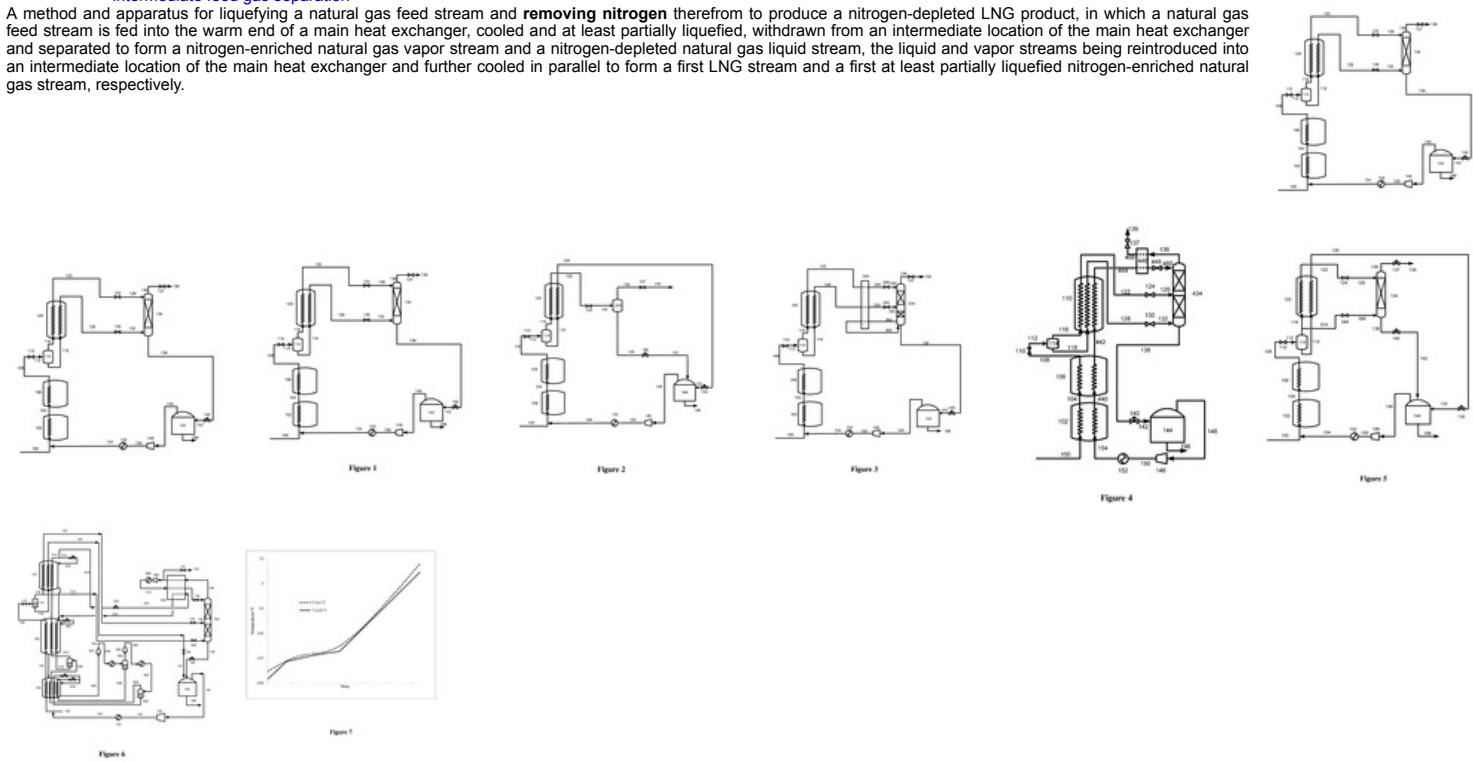
2014-04-24

AIR PRODUCTS & CHEMICALS*

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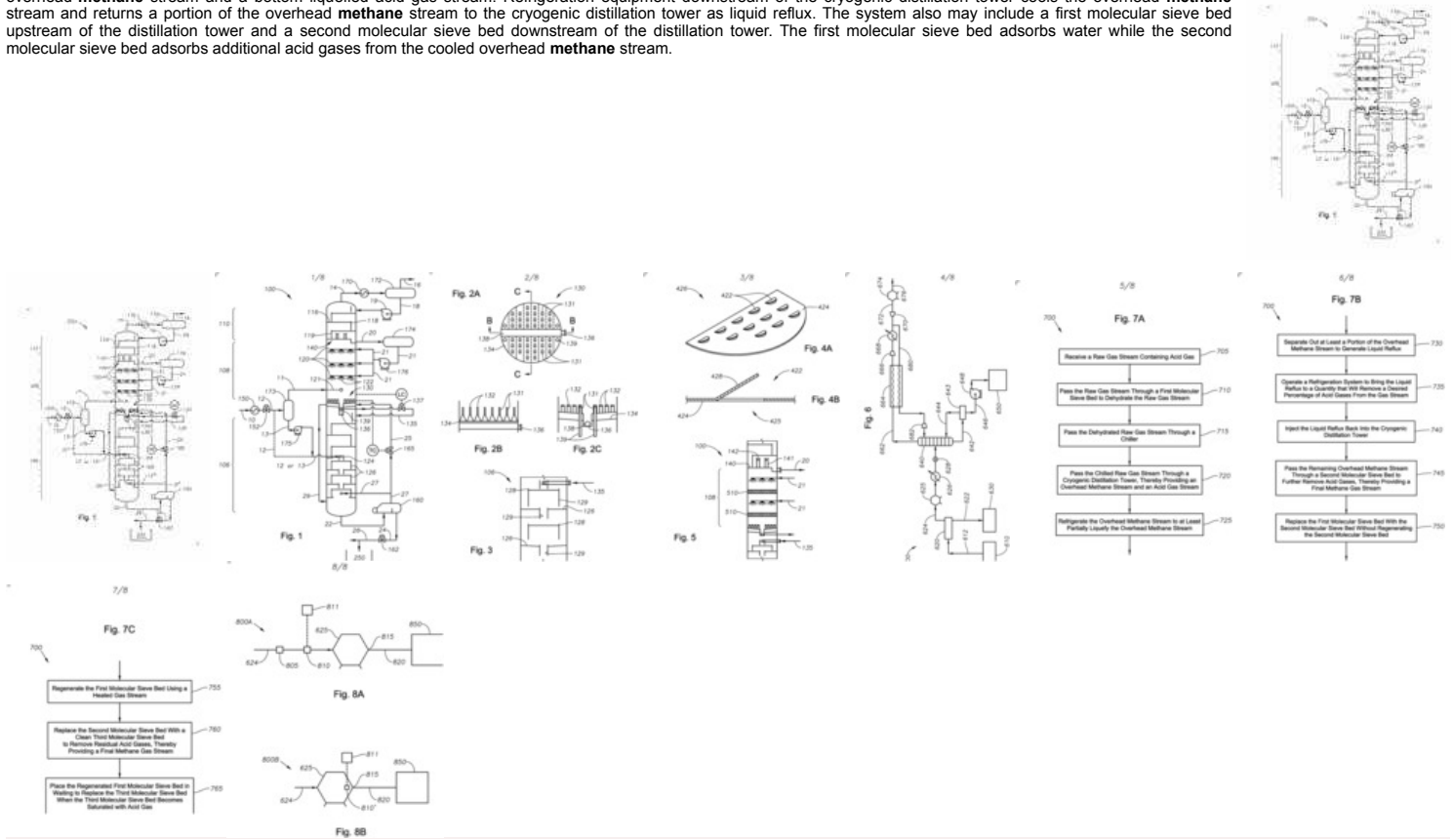
2015-04-28

A method and apparatus for liquefying a natural gas feed stream and removing nitrogen therefrom to produce a nitrogen-depleted LNG product, in which a natural gas feed stream is fed into the warm end of a main heat exchanger, cooled and at least partially liquefied, withdrawn from an intermediate location of the main heat exchanger and separated to form a nitrogen-enriched natural gas vapor stream and a nitrogen-depleted natural gas liquid stream, the liquid and vapor streams being reintroduced into an intermediate location of the main heat exchanger and further cooled in parallel to form a first LNG stream and a first at least partially liquefied nitrogen-enriched natural gas stream, respectively.



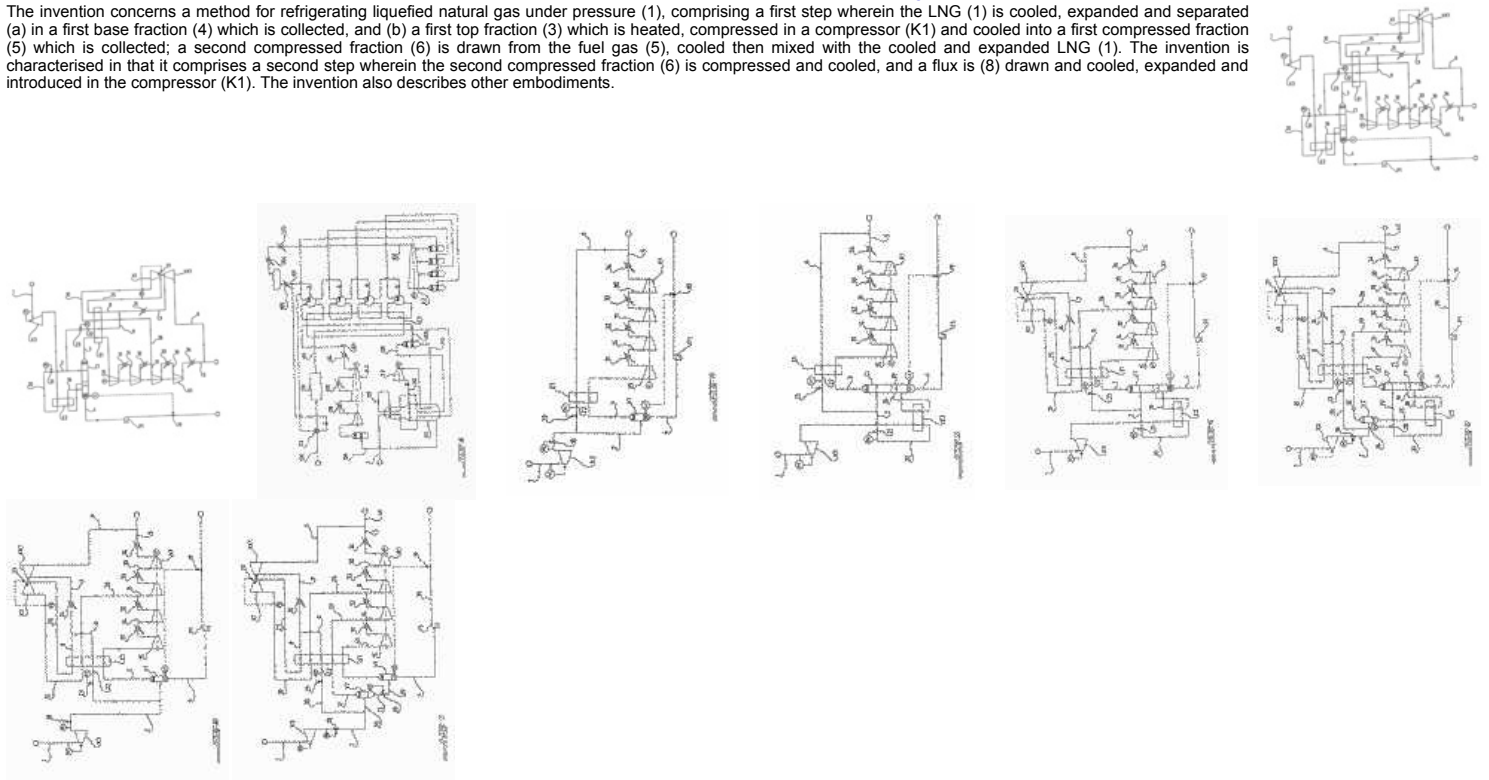
10.	Cryogenic system for removing acid gases from a hydrocarbon gas stream, and method of removing acid gases	WO2010123598	2010-01-22	EXXONMOBIL UPSTREAM RESEARCH*	2010-10-28 2010-10-28
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A system for removing acid gases from a raw gas stream the system includes a cryogenic distillation tower. The tower receives and separates the raw gas stream into an overhead **methane** stream and a bottom liquefied acid gas stream. Refrigeration equipment downstream of the cryogenic distillation tower cools the overhead **methane** stream and returns a portion of the overhead **methane** stream to the cryogenic distillation tower as liquid reflux. The system also may include a first molecular sieve bed upstream of the distillation tower and a second molecular sieve bed downstream of the distillation tower. The first molecular sieve bed adsorbs water while the second molecular sieve bed adsorbs additional acid gases from the cooled overhead **methane** stream.

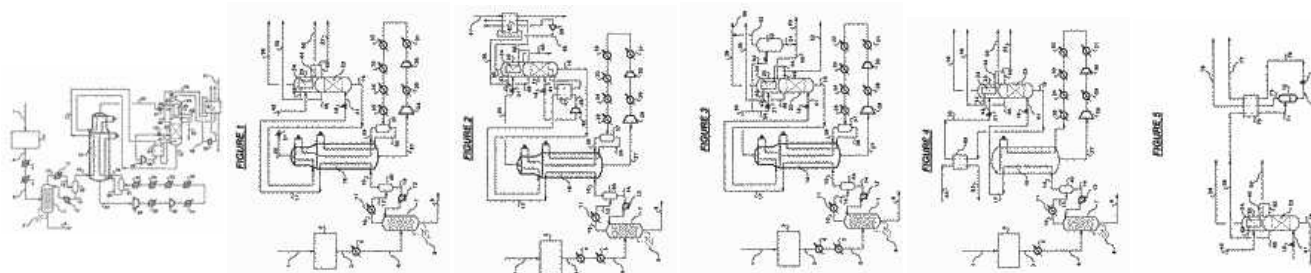
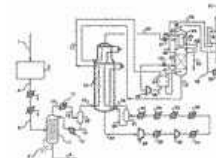


11.	Method for refrigerating liquefied gas and installation therefor	FR2818365	2000-12-18	TEKNIP TEKNIP COFLEXIP TEKNIP FRANCE* TEKNIP FRANS	2002-06-21 2002-06-21
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The invention concerns a method for refrigerating liquefied natural gas under pressure (1), comprising a first step wherein the LNG (1) is cooled, expanded and separated (a) in a first base fraction (4) which is collected, and (b) a first top fraction (3) which is heated, compressed in a compressor (K1) and cooled into a first compressed fraction (5) which is collected; a second compressed fraction (6) is drawn from the fuel gas (5), cooled then mixed with the cooled and expanded LNG (1). The invention is characterised in that it comprises a second step wherein the second compressed fraction (6) is compressed and cooled, and a flux is (8) drawn and cooled, expanded and introduced in the compressor (K1). The invention also describes other embodiments.



Nitrogen is removed from a liquefied natural gas feed (41) by a two stage separation in which the liquefied natural gas (41) is first fractionated (23) to provide a first nitrogen-enriched overhead vapour stream (46) and a nitrogen- containing bottoms liquid stream (19) and then at least a portion of said bottoms liquid stream (19) is fractionated (25) to provide a second nitrogen-enriched overhead vapour stream (36) that is of lower purity than said first overhead vapour stream (46) and a purified liquefied natural gas stream (50). The first fractionation is conducted in a **distillation column** (23) refluxed (45) with nitrogen overhead (43) condensed in a condenser (24) located in a flash drum (25) in which the second fractionation is conducted. The provision of two nitrogen-containing streams (26, 36) of different concentration permits control of the nitrogen content of fuel gas for use in the natural gas liquefaction plant.



13. Low-temperature denitrification and deoxidation device of **methane** gas

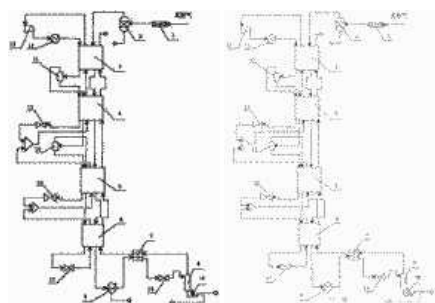
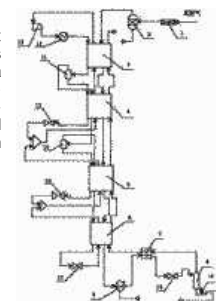
CN202519219

2012-03-31

LINXIANG.JIA

2012-11-07 2012-11-07

The utility model discloses a low-temperature denitrification and deoxidation device of **methane** gas, relates to a device for comprehensively treating the **methane** gas, and aims to solve the problems that all gas flows required for separating oxygen and nitrogen in the **methane** gas by using the conventional equipment is deeply dried, the heat exchange area is large, and the equipment is limited by the number of low-pressure users, and is low in liquefaction rate and high in maintenance cost. The **methane** gas passes through a compressor and a purification system, and then is subjected to cooling liquefaction through each heat exchanger, a reboiling kettle heat exchanger and a heat exchanger in sequence, and cooling liquefied gas passes through a throttling valve for throttling cooling, and then enters a rectifying tower for low-temperature rectification, so that a high-purity liquefied natural gas is led out from the bottom of the rectifying tower to serve as a liquefied natural gas (LNG) product, and a high-concentration nitrogen-oxygen mixed gas is discharged from the top of the rectifying tower and sequentially passes through every heat exchanger for rearming and providing recovery cold energy. The low-temperature denitrification and deoxidation device has the advantages of simple process, low one-time investment, high separation efficiency and high energy utilization ratio, and a small amount of unit equipment is required.



14. A process for separating a multi-component pressurized feed stream using distillation

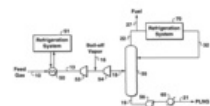
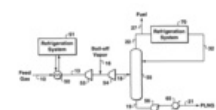
WO200023164

1999-10-12

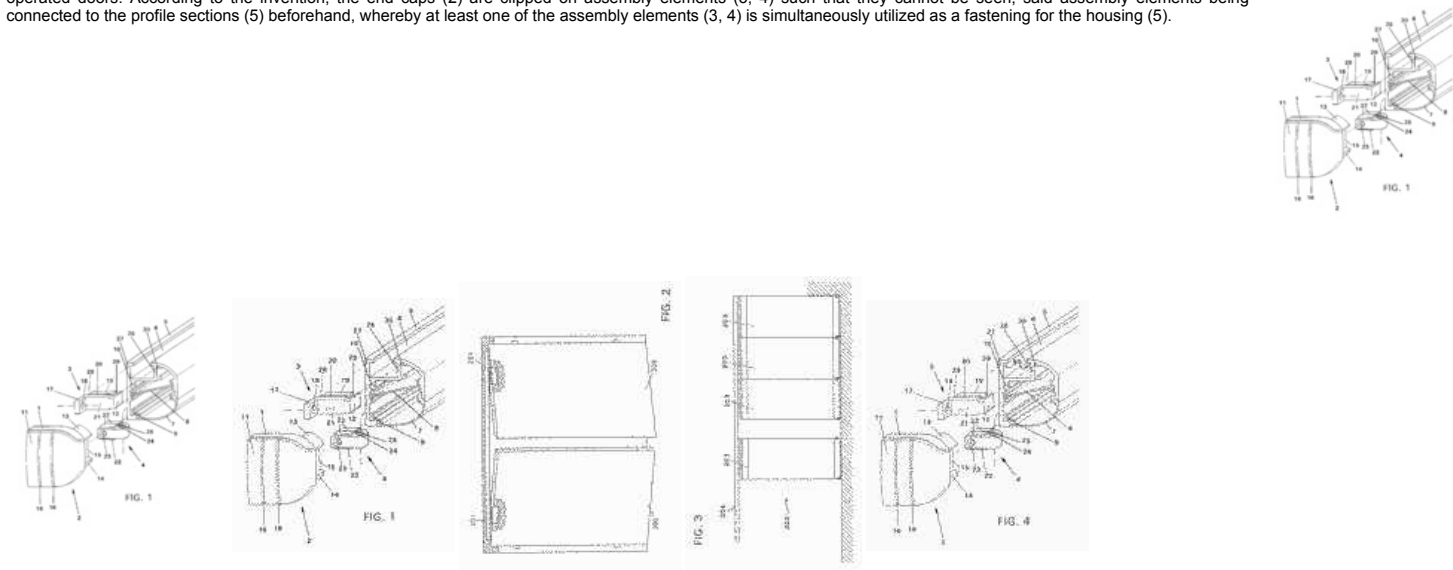
EXXON PRODUCTION RESEARCH
EXXONMOBIL UPSTREAM
RESEARCH*

2000-04-27 2000-04-27

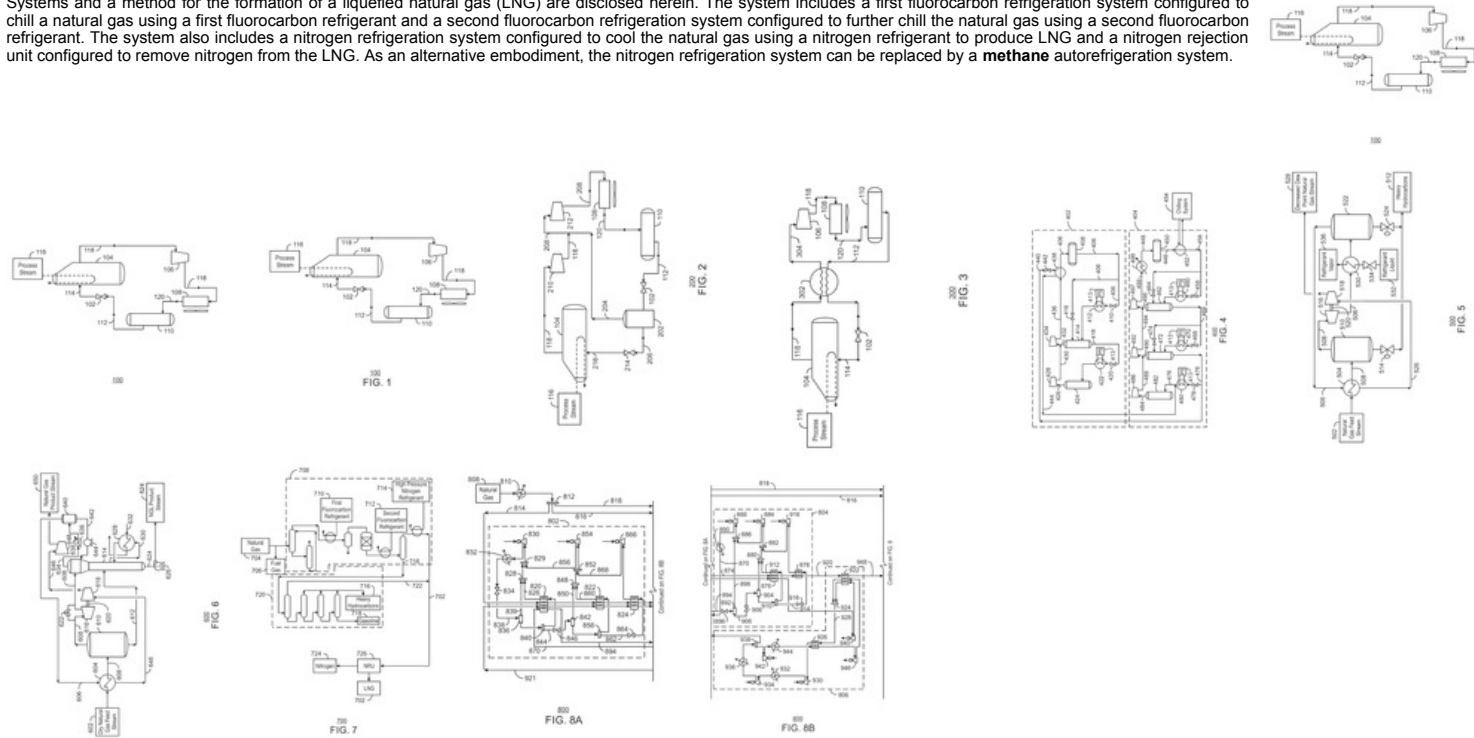
A process is disclosed to remove a high-volatility component, such as nitrogen, from a feed stream rich in **methane** to produce a product substantially free of the high-volatility component. The feed stream is expanded (53) and fed to a phase separator (55) which produces a vapor stream (22) and a liquid stream (19). The vapor stream is enriched in the volatile component. The liquid stream, which is lean in the volatile component and rich in **methane**, is pumped (56) to a higher pressure and heated to produce a pressurized liquefied product stream having a pressure sufficient for the product stream to be at or below its bubble point and having a temperature above about -112 DEG C (-170 DEG F).



The invention relates to a fastening of end caps (2) on housings (5) which are comprised of profile sections and which are used for door-specific devices of automatically operated doors. According to the invention, the end caps (2) are clipped on assembly elements (3, 4) such that they cannot be seen, said assembly elements being connected to the profile sections (5) beforehand, whereby at least one of the assembly elements (3, 4) is simultaneously utilized as a fastening for the housing (5).



Systems and a method for the formation of a liquefied natural gas (LNG) are disclosed herein. The system includes a first fluorocarbon refrigeration system configured to chill a natural gas using a first fluorocarbon refrigerant and a second fluorocarbon refrigeration system configured to further chill the natural gas using a second fluorocarbon refrigerant. The system also includes a nitrogen refrigeration system configured to cool the natural gas using a nitrogen refrigerant to produce LNG and a nitrogen rejection unit configured to remove nitrogen from the LNG. As an alternative embodiment, the nitrogen refrigeration system can be replaced by a methane autorefrigeration system.



17.	Nitrogen rejection column reboiler configuration	WO2008155653	2007-06-19	AIR PRODUCTS & CHEMICALS*	2008-12-24	2008-12-24
An expanded (102) and cooled (106) crude LNG stream (108) is separated in a nitrogen rejection column (150) into a nitrogen-enriched overhead vapor stream (130) and a nitrogen-diminished bottoms liquid stream (110). The bottoms stream (110) is pumped (112) to higher pressure, divided into first and second streams (114 & 116) and then the second stream is reduced in pressure and at least partially vaporized (118) by heat exchange (106) against the crude LNG feed stream (104) to cool said feed stream and provide (120) boilup to the nitrogen rejection column (150).						



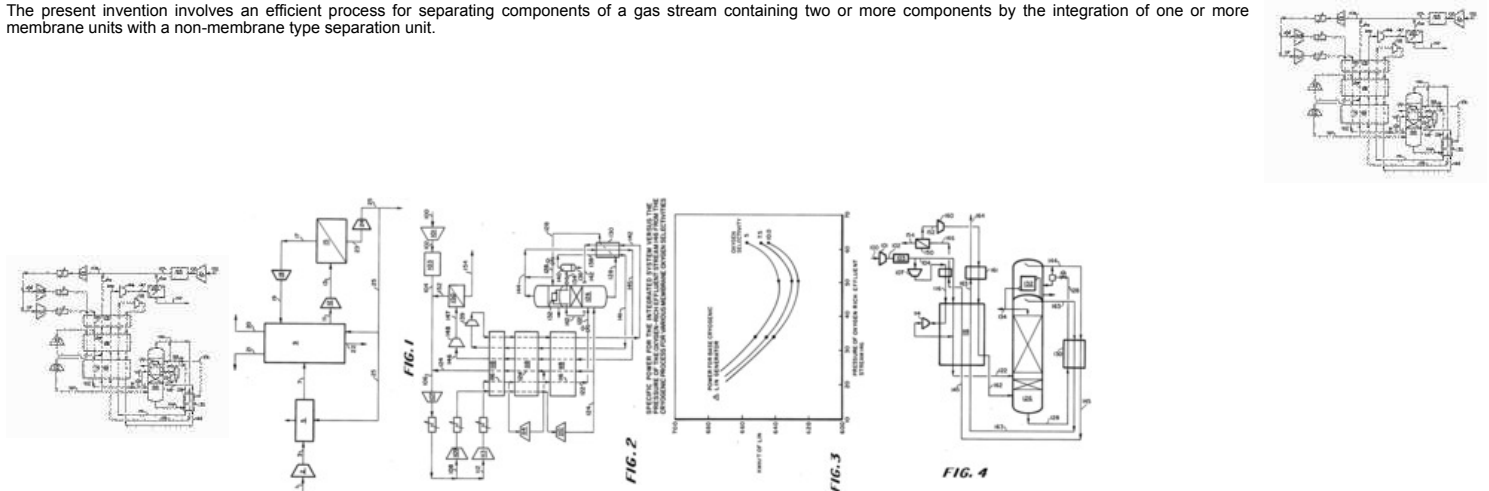
18.	Method for removing mercaptans from lng	US5659109	1996-06-04	KELLOGG BROWN & ROOT* MW KELLOGG	1997-08-19	1997-08-19
Method for separating mercaptans from a natural gas feed stream to be liquified, comprises (a) introducing the feed stream to a refluxed scrub column to form an overhead methane stream and a liquid bottoms stream rich in ethane and heavier hydrocarbons; (b) fractionating the bottoms stream from step (a) to form a natural gas liquids stream consisting of pentane and heavier hydrocarbons, and on or more overhead streams consisting primarily of ethane, propane and butane; (c) removing mercaptans from at least one of the overhead streams from step (b) to form a mercaptan-lean stream; (d) partially condensing and separating the overhead stream from step (a) to form vapour and liquid streams; (e) recycling at least a portion of the liquid stream from step (d) as at least a portion of the reflux to the scrub column in step (a); and (f) cooling the vapour stream from step (d) to form a liquified natural gas stream.						



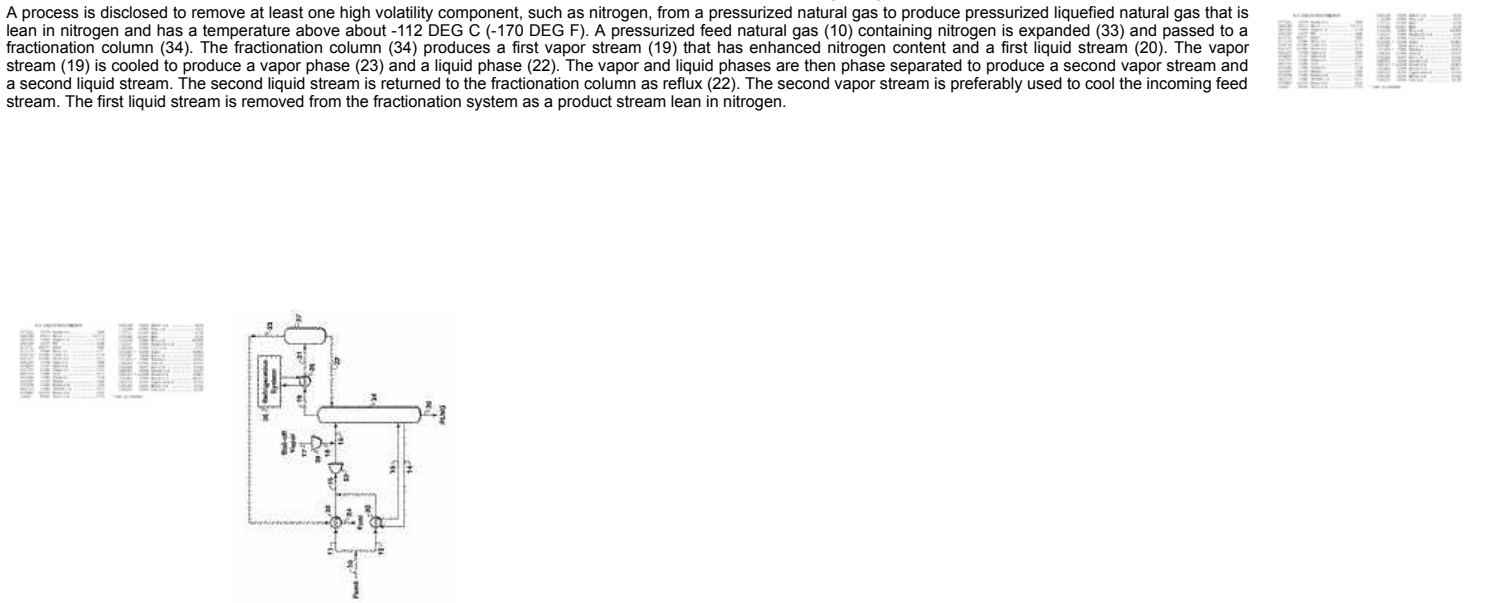
19.	Method and system for separating nitrogen from liquefied natural gas	CN104263443	2014-09-19	BEIJING ENCRYO ENGINEERING*	2015-01-07	2015-01-07
The invention relates to a method and a system for separating nitrogen from a liquefied natural gas. The system comprises a denitrification tower, a denitrification tower reboiler, a flash tank, an ice chest, a cold separator, an LNG storage tank, a volatile gas compressor and the like. The method comprises the following steps: firstly, cooling a deacidified and dewatered nitrogen-rich natural gas to -145 DEG C to -162 DEG C, throttling and carrying out first separation on nitrogen; carrying out gas-liquid separation in the LNG storage tank to obtain a volatile gas; reheating, compressing and cooling the volatile gas, carrying out cryogenic treatment in the ice chest, then feeding the volatile gas subjected to cryogenic treatment to the denitrification tower to rectify, and carrying out second deep separation on the nitrogen; further cooling an overhead gas, and then carrying out third separation on the nitrogen in the flask tank; and recovering heat from the obtained gas phase to obtain a nitrogen-rich tail gas. According to the method disclosed by the invention, through the processes of twice flash evaporation and once distillation, nitrogen in the liquefied natural gas is removed; the nitrogen content in the product LNG is reduced to below 1%; the nitrogen content in the tail gas reaches 99.9%; and the methane content is reduced to 0.1%. The method disclosed by the invention is good in denitrification effect, and low in energy consumption; the separated nitrogen can be supplemented as a refrigerant or used as plant nitrogen; therefore, the method and the system have good environmental benefits and social benefits.						



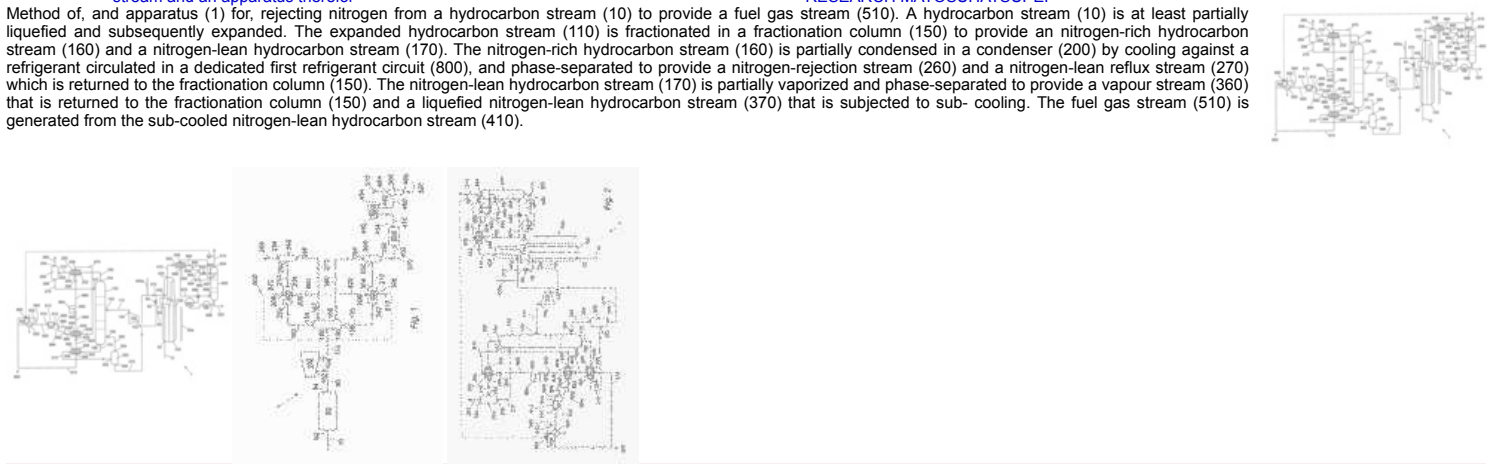
The present invention involves an efficient process for separating components of a gas stream containing two or more components by the integration of one or more membrane units with a non-membrane type separation unit.



A process is disclosed to remove at least one high volatility component, such as nitrogen, from a pressurized natural gas to produce pressurized liquefied natural gas that is lean in nitrogen and has a temperature above about -112 DEG C (-170 DEG F). A pressurized feed natural gas (10) containing nitrogen is expanded (33) and passed to a fractionation column (34). The fractionation column (34) produces a first vapor stream (19) that has enhanced nitrogen content and a first liquid stream (20). The vapor stream (19) is cooled to produce a vapor phase (23) and a liquid phase (22). The vapor and liquid phases are then phase separated to produce a second vapor stream and a second liquid stream. The second liquid stream is returned to the fractionation column as reflux (22). The second vapor stream is preferably used to cool the incoming feed stream. The first liquid stream is removed from the fractionation system as a product stream lean in nitrogen.



Method of, and apparatus (1) for, rejecting nitrogen from a hydrocarbon stream (10) to provide a fuel gas stream (510). A hydrocarbon stream (10) is at least partially liquefied and subsequently expanded. The expanded hydrocarbon stream (110) is fractionated in a fractionation column (150) to provide an nitrogen-rich hydrocarbon stream (160) and a nitrogen-lean hydrocarbon stream (170). The nitrogen-rich hydrocarbon stream (160) is partially condensed in a condenser (200) by cooling against a refrigerant circulated in a dedicated first refrigerant circuit (800), and phase-separated to provide a nitrogen-rejection stream (260) and a nitrogen-lean reflux stream (270) which is returned to the fractionation column (150). The nitrogen-lean hydrocarbon stream (170) is partially vaporized and phase-separated to provide a vapour stream (360) that is returned to the fractionation column (150) and a liquefied nitrogen-lean hydrocarbon stream (370) that is subjected to sub-cooling. The fuel gas stream (510) is generated from the sub-cooled nitrogen-lean hydrocarbon stream (410).



23.

Recovery of natural gas liquids, helium concentrate, and pure nitrogen

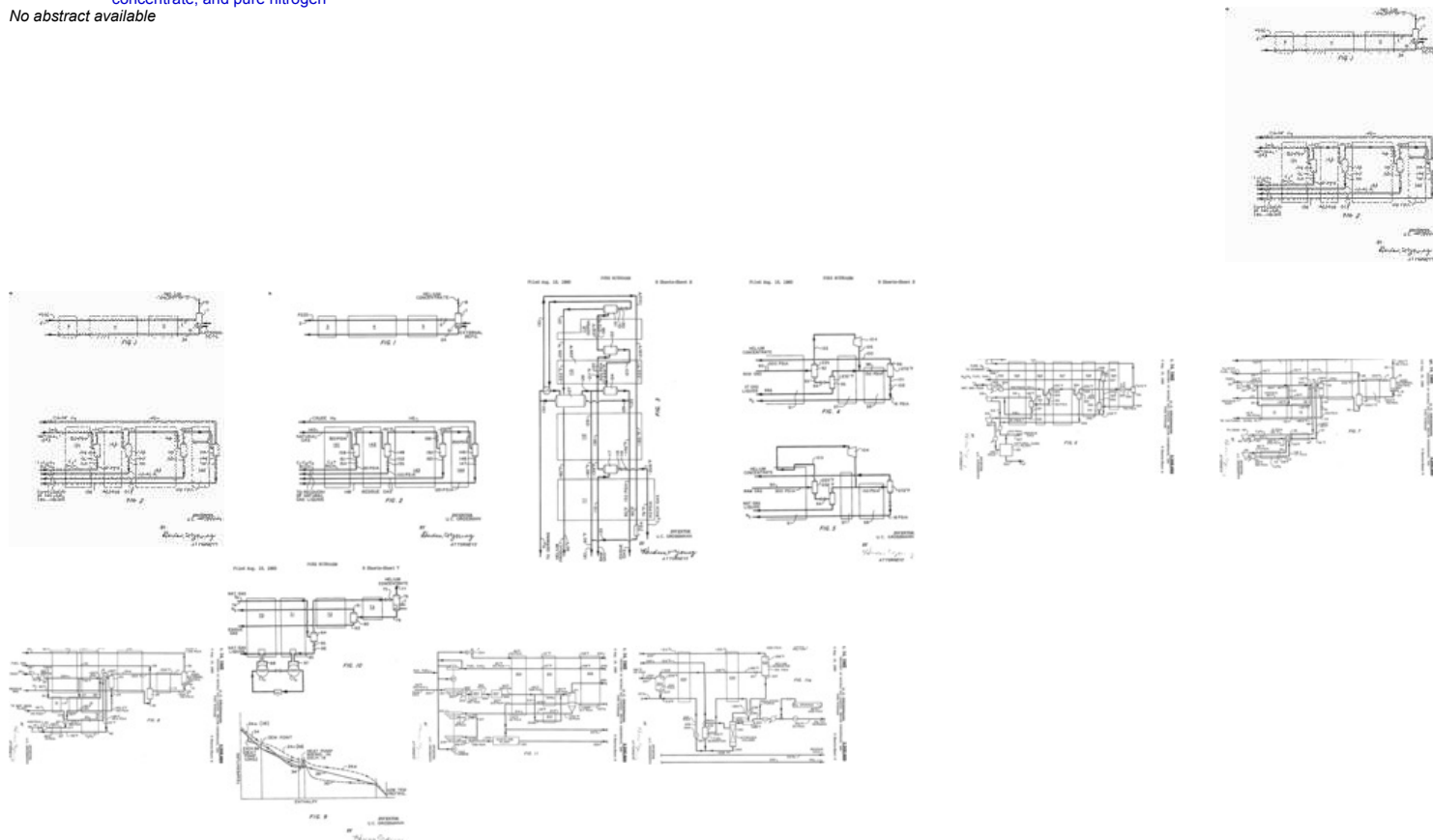
US3205669

1960-08-15

PHILLIPS PETROLEUM*

1965-09-14 1965-09-14

No abstract available



24.

Methods for removing contaminants from natural gas WO2011139500

2011-04-12

LINDE*

2011-11-10 2011-11-10

A method for removing contaminants from natural gas streams. The natural gas stream is fed to a dryer, then a membrane module and a multibed, multilayer vacuum swing adsorption process for removal of oxygen, nitrogen and carbon dioxide from the natural gas stream. Alternatively when carbon dioxide is in relatively low concentration in the natural gas stream, the membrane module step is not employed.

