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Canadian Intellectual Property Office
An agency of Industry Canada

CA 2728035 A1 2012/06/20

(21) 2 728 035

(12) DEMANDE DE BREVET CANADIEN
CANADIAN PATENT APPLICATION

(13) A1

(22) Date de dépôt/Filing Date: 2010/12/20

(41) Mise à la disp. pub./Open to Public Insp.: 2012/06/20

(51) Cl.Int./Int.Cl. *C10L 3/12* (2006.01)

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(54) Titre : SEPARATEUR MULTI-ETAGES POUR LA RECUPERATION DU PROPANE A PARTIR DE DECHETS DE GENERATEUR

(54) Title: MULTI-STAGE SEPARATOR FOR PROPANE RECAPTURE GENERATOR WASTE

(57) Abrégé/Abstract:
Propane Recovery gases with Methane gases from oil well are a combustible mixture of hydrocarbon gases. While natural gas is formed primarily of methane, it can also include ethane, propane, butane and pentane. The composition of Propane and Natural gas can vary widely, but below is a chart outlining the typical makeup of Propane and Natural gas before it Enters the heat exchanger and chiller. Typical Composition of Propane and Natural Gas Wells Methane CH_4 17-90%

Abstract:

Propane Recovery gases with Methane gases from oil well are a combustible mixture of hydrocarbon gases. While natural gas is formed primarily of methane, it can also include ethane, propane, butane and pentane. The composition of Propane and Natural gas can vary widely, but below is a chart outlining the typical makeup of Propane and Natural gas before it Enters the heat exchanger and chiller.

Typical Composition of Propane and Natural Gas Wells

Methane	CH_4	17-90%

Application number / numéro de demande: 2728035. DIS

Figures: _____

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Unscannable items
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Statement That a New Technology Process is Source

Summary of the Multi-Stage Separator FOR Propane Recapture Generator Waste.

The multi-stage separator is a 285PSI WP Vessel. The Separators further relates to process of separating the components of oil well recovery drilling fluid, solids, water, oil, and propane and methane gas, under pressurized conditions.
Direction drilled horizontal wells or vertical wells using Liquid Propane for Fracing with Gel/chemical as the circulating Medium with sand. The Liquid Propane process performs two functions;

1) It provides a column of light Gel/fluid that exerts Hydrostatic pressure at the end of the wellbore, to Carry sand and gel into the wellbore.

2) When this occurs, the productivity of the well can be Adversely affected, The Liquid Propane Gel/ chemical and sand have penetrated radically into the formation acts to impede the flow of hydrocarbons into the wellbore.

Technique process for opening up the pay zone of the directional drilled horizontal and vertical wells typically, the wells are completed with casing, but some wells are open hole with no casing. Then drilling is initiated into the pay zone using a relatively Liquid Propane/Gel/Water/Sand/Balls mix. The process was tested so that the hydrostatic head created by it is less than the expected reservoir pressure.

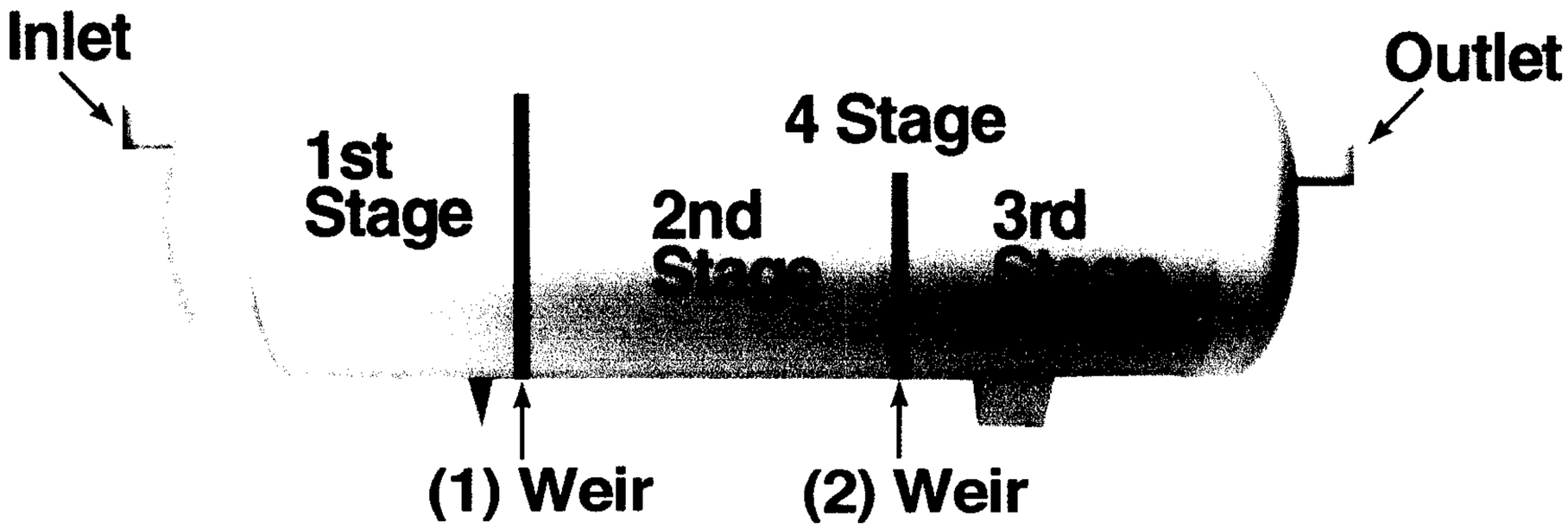
However, when this is done there is like hood that pressurized hydrocarbons present in the reservoir will be produced into the wellbore.
Thus the circulated liquid Propane/Gel/Water/Sand/Balls mix returning out of the wellbore will often comprise oil, water, and suspended solids.

Document Describing an Invention Process

The multi-stage vessel separator for separating the Components of the liquid Propane/solids/water/oil returning from the well to produce separate streams of solids, Liquid propane, oil, water, propane and methane gas when present in the fluid.

The process is comprised a horizontal, cylindrical pressure vessel Having a side wall and curved heads at its end which together form a closed internal chamber, having upstream and down Stream ends. Inlet means for introducing the fluid through an aperture into the upper portion of the vessel chamber at its upstream end.

Cuttings outlet means, positioned at the bottom of the chamber at its upstream end, for removal of solids cuttings.



Stage 1

A first weir extending upwardly from the bottom and transversely of the chamber, the first weir is away from the upstream end head and being sealed to the vessel sidewall, the first weir having its top rim spaced below the inlet means aperture, the bottom end of the weir positioned close to the upstream end head on the downstream side of the cuttings.

Stage 2

A second weir extending upwardly from the bottom and transversely of the chamber, the weir sealed to the side wall and having its top rim spaced below the top rim of the first weir, second weir being spaced downstream from the first weir, thereby combining with the first weir to define a second compartment for collecting fine solids and water and combining with the downstream end head to define a third compartment. The water outlet means communicating with the second compartment.

A man way provides access to the intermediate compartment and capped drains are provided in the bottom of the vessel side wall

for removal of flush water and solids when cleaning the intermediate compartment.

Stage 3

A third compartment is defined by the weir side wall and outlets end head. A riser extent upwardly into the third compartment and provides an outlet for removal of oil. The oil outlet is positioned beneath the rim. Capped drained are provided in the bottom of the vessel side wall for removal of oil and flush water when cleaning the third compartment.

Stage 4

A forth compartment gas outlet extents through the outlet head from the upper end of the vessel chamber for removal of liquefied Propane gas.

The returning fluid is introduced into the upper end of the vessel chamber through the feed inlet. Turbulence is minimized by slowing the velocity of the incoming feed stream as it advances through the expanding passageway of the feed inlet by discharging it horizontally. Contained coarse solid sand settles downwardly in the inlet compartment and is funnelled down to the bottom outlet.

They are withdrawn through the bottom outlet by a vacuum truck. Gas breaks out of the feed as it is delivered to the inlet compartment. The Propane gas is removed from the chamber through the gas outlet.

Fluid overflows the weir rim and is temporarily retained in the intermediate compartment. Fine solids still entrained in the liquid settle out and collect on the bottom of the compartment. Oil overflows the rim of the second weir. Water is removed from the second or intermediate compartment through the submerged outlet of the riser. The oil entering the third compartment is removed through the submerged outlet of the riser.

When the Propane recovery is completed, the fine solids in the intermediate compartment can be removed by opening the man-way and washing them out through the drains with a pressure hose, without entering the vessel chamber.

Ptank stream coils are at the bottom of the Ptank 1" inlet coming into the vessel Front wall. The heated water coming from the line heater pump circulating hot water travels thru the Ptank 2" coils stage compartments return to the line heater inlet, hot water around 90c helps with Gas break out from the oil and chemicals. The stream coils provide access to the intermediate compartment coils for heating the liquids inside the Ptank.

Once the return liquids (oil & chemicals) enter in side the Ptank are heated up, Gas breaks out of the Liquid. As it is Delivered to the outlet compartment, The Propane gas is Removed from the stage compartment chamber, any liquid propane would be able to be trap and heated in stage 2 compartments as the circulating hot water is return to the line heater inlet.

As the Propane gas stream travel thru the Ptank meter run typically at 200 psi-250 psi pressure and therefore do not required compression prior to the processing, Since downstream processing also requires distillation and liquefaction of the propane gases.

The min pressure from the Ptank for Propane gas feed is approximately 200-250 psi. This pressure can be achieved by closing back pressure on Ptank till it's approximately set at 200-250 psi. As the gas stream travels thru the 4" flare line coming into the Propane Recapture Generator container sits 50 m from the Ptank, which is the same as a flare stack.

As the propane gas feed enter the Vortex fluid purification is typically required to remove certain heavy hydrocarbons and corrosive components in the propane gas feed stream. The

infrared multi-gas analyzer specifically designed to meet four gases at once propane, methane, butane, Iso-butane provide retime measurement with print out to monitor percent of propane.

The heat exchanger is a specialized device that assists in the transfer of high efficiency, brazed aluminum coolers for cooling a wide variety of gases with ambient air. Light weight, yet rugged, capable of cooling gas stream with cooling fans, water, or other cooling fluid.

Following dehydration, the process propane gas stream is feed to a distillation column/ liquefaction mechanical refrigeration system where the propane gases portion of the stream is liquefied 2m3 - 3m3 per hour and separated.

Natural gas is considered 'dry' when it is almost pure methane, having had most of the other commonly associated hydrocarbons removed. When other hydrocarbons are present, the natural gas is 'wet'.

Propane gas and methane gas is associated with oil deposits recovery, once recovery thru the multi-stage Ptank, The propane and natural gas is refined to remove impurities such as water, other gases, sand, and other compounds. Some hydrocarbons are removed and sold separately, including propane. After refining the propane gas to a liquid, the clean natural gas is transmitted through a network of pipe lines into the liquid propane holding tank. The methane gas travels thru the liquid propane holding tank, gas and is delivered to its point of use or flared.

In its purest form, such as the propane gas and natural gas that is recovery from the oil well is chill to form liquid propane,

It is almost pure methane that is recapture coming off the chiller side. The methane is flare off or supply to pipeline for sale gas.

The advantages of the Propane Recapture Generator Process are:

- It does not require a separating agent, thus no regeneration is required;
- The systems are compact and can be positioned either horizontally or vertically, which is especially suitable for retrofitting applications in vessel.
- Modular design allows optimization of process arrangement by using multi-stage operation.
- Low maintenance requirements because there are no moving parts in the heat exchanger and chiller systems.

The object is to get more Liquid propane and separation of methane gases. The propane filters are driven device by the pressure of the Ptank, which feeds gases from the 4 inch out let on the pressure vessel. The feed gas pressure is at 1380 kpa psig through the filter and into the heat Exchanger and mixed with the fuel. The high density Propane recovered is a richer, more potent fuel of 95%.

Propane and Methane Gases Filter System

In order to keep the system as reliable as possible, purity control adjustment will be manual, and product flow rate and Propane percentage are provided as read-outs on the main control manual with 4-20 ma output signals available. Our system is equipped with a informed precision Sierra flow meter to monitor

Layout and Operating Requirements

The entire propane system, including the light plant are installed on a 40 ft long x 8 ft wide x 8.5 ft high to be accessed from the side. There is a operator console, but some of the key process read outs can be sent to the main lab top.

Propane Process Temp Control System

In order to keep the system as reliable as possible, purity control adjustment will be manual, and product propane flow rate and methane flow rate percentage will be provided as read-outs on the main control manual with 4-20 ma output signals available. Our system is equipped with a high precision Sierra flow meter to monitor propane and methane fuel production.

What Is Claimed?

1. Recapture of waste propane gases from a oil well

2. a process design to recapture the Propane and Methane Gases for separation

3. An outlet line piping 4" to feed the after chiller from the Heat Exchanger including a 2" date header for monitor emissions gases, pressure and temp

4. Check valve.

5. Insulation piping for chiller operations

6. Propane percent to 93%- Higher %

7. Multi-stage pressure vessel, know as a Ptank

8. Liquid propane holding tank

9. Heat Exchanger @500psi, shell and

10. Vortex Fluid Separator Trap

11. **Coalescing Filter**

12. **Aerolescer Filter**

13. **Heater Exchanger**

14. **Multicomponent Gas Analyzer**

15. **Power Chiller Production**

Main Claims:

1. **Recovered propane product gas purity then currently achievable in chiller existing equipment**

2. **More compact and portable system than currently is available to produce high purity of propane liquid and methane gases at high flow rates.**

3. **The capability of converting existing pressure air compressors into Oxyfuel combustion systems**

4. **The ability of generating a high pressure recovery without the need for a dedicated feed gas compressor**

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