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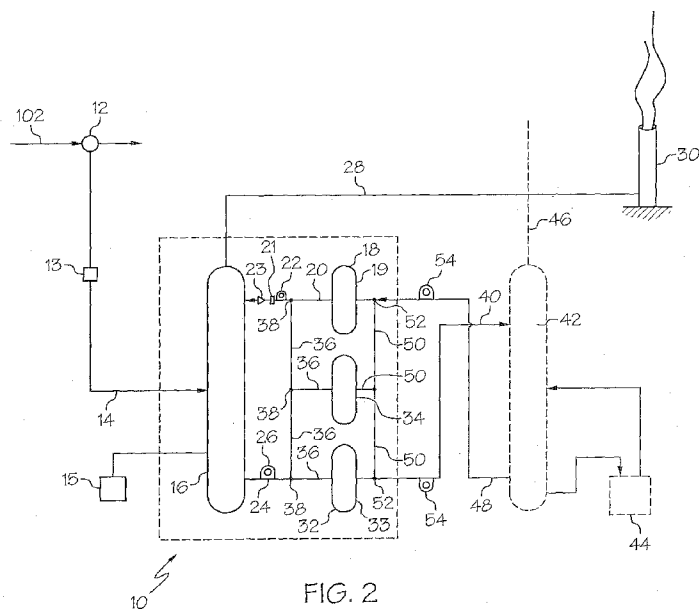
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(54) Title: AUXILIARY ACID AND SOUR GAS TREATMENT SYSTEM AND METHOD



(57) Abstract: An auxiliary sour gas treatment system for treating a stream of sour gas during a time wherein a primary gas treatment facility is unavailable, malfunctioning, inadequate or inoperable. The auxiliary sour gas treatment system comprises a lean solvent storage system to store an appreciable volume of a regenerable lean solvent available on demand. A scrubber to treat an influent supply of the sour gas by contacting the sour gas and the lean solvent which chemically or physically binds the contaminants in the sour gas resulting in a cleaned gas suitable for disposal or use as a fuel, and the solvent in an enriched state that contains the removed contaminants. The enriched solvent resulting from treatment may be stored indefinitely in a rich solvent storage system and then regenerated at any convenient time and at any convenient rate or place to remove the contaminants from the rich solvent.

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - B01D 46/00; B01D 47/00 (2014.01)

CPC - B 01D 47/06 B 01D 53/34 B 01D 47/02 B 01D 47/10 B 01D 51/02

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
USPC- 95/214

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

IPC(8)- B01D 46/00; B01D 47/00 (2014.01)

USPC- 95/214,235; 96/364,355,363; CPC- B 01D 47/06 B 01D 53/34 B 01D 47/02 B 01D 47/10 B 01D 51/02

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

PatBase (PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD), FreePatentsOnline (US Pat, PgPub, EPO, JPO, WIPO, NPL), GoogleScholar (PL, NPL); search terms: auxiliary acid sour gas treatment system

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/0012622 A1 (Frondorf) 31 January 2002 (31.01.2002) abstract, para [0014]-[0024], [0035]- [0037]	1-3, 5-33
Y		4
Y	Brown, Emergency and Standby Power Systems, 07 March 2006 (07.03.2006) <a href="http://static.schneider-electric.us/assets/consultingengineer/appguidedocs/section10_0307.pdf">http://static.schneider-electric.us/assets/consultingengineer/appguidedocs/section10_0307.pdf</a> , accessed on 15 September 2014 (15.09.2014) pg 11, Article 701	4 1-33
X	US 2012/0078027 A1 (Dickinson et al.) 29 March 2012 (29.03.2012) abstract, para [0056], [0087]- [0091], [0118]	1-33
X	US 2003/0084787 A1 (Hattori et al.) 08 May 2003 (08.05.2003) abstract, para [0046]-[0063], [0077], [0088]	1-33
Y	US 2011/0195006 A1 (Johnson) 11 August 2011 (11.08.2011) abstract, para [0030]-[0031], [0034], [0082]	1-33
Y	US 2012/0055848 A1 (Subramaniyam) 08 March 2012 (08.03.2012) abstract, para [0019]-[0024]	1-33
X, P	US 2013/0284677 A1 (Snydmiller et al.) 31 October 2013 (31.10.2013) abstract, para [0052]-[0053], [0092]-[0093]	1-33

 Further documents are listed in the continuation of Box C.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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

Date of the actual completion of the international search

15 September 2014 (15.09.2014)

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**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

Group I, claims 1-13, directed to an auxiliary sour gas treatment system in fluid communication with said primary gas treatment system to treat a diverted sour gas stream during a time period when processing steps are inoperable

Group II, claims 14-21, 30-33, directed to an auxiliary sour gas treatment system operable to treat a stream of a sour gas having a scrubber in fluid communication with said supply of said sour gas and said lean solvent storage system and an auxiliary scrubbing system for removing hydrogen sulfide from a sour gas

Group III, claims 22-29, directed to a method for treating a substantially continuous supply of sour gas to a primary gas treatment facility in an auxiliary sour gas treatment system that is in fluid communication with said primary gas treatment facility upon the occurrence of a triggering event

-----Continued in the supplemental box-----

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2.  As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

**Remark on Protest**

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

Continuation of Box III, lack of unity

The groups of inventions listed above do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

**Special Technical Features (Distinct Technical Features):**

The special technical feature of Group I is an auxiliary sour gas treatment system in fluid communication with a primary gas treatment system to treat a diverted sour gas stream during a time period when processing steps are inoperable, not required in any other group. The special technical feature of Group II is an auxiliary sour gas treatment system having a scrubber in fluid communication with a supply of sour gas and lean solvent storage system, and an auxiliary scrubbing system for removing hydrogen sulfide from a sour gas; not required in any other group.

The special technical feature of Group III is a method for treating a substantially continuous supply of sour gas to a primary gas treatment facility in an auxiliary sour gas treatment system that is in fluid communication with said primary gas treatment facility upon the occurrence of a triggering event, not required in any other group.

**Common Technical Features (Features Do Not Make a Contribution Over the Prior Art):**

Groups I-III are related as a system for sour gas treatment (Groups I-II) and a method for the sour gas treatment (Group III) and share the technical features of a primary sour gas treatment system, an auxiliary sour gas treatment system, a regenerable solvent in a lean state.

Groups II-III share the technical feature of a scrubber. However, these technical features are not unifying technical features, because they do not make a contribution over the prior art in view of Applicant Admitted Prior Art in claim 1 Jepsen Preamble (hereinafter 'AAPA') in view of US 2012/0078027 A1 to Dickinson et al. (hereinafter Dickinson).

AAPA teaches the technical features of a primary sour gas treatment system having a plurality of processing steps for removing one or more contaminants including hydrogen sulfide from sour gas, the system comprising: an absorber, a regenerator in fluid communication with said absorber, and a volume of a regenerable primary solvent cycling substantially continuously through said absorber and said regenerator, wherein said supply of sour gas enters said absorber and wherein said regenerable primary solvent in a lean state contacts at least a portion of said supply of sour gas in said absorber and either chemically or physically binds some of said hydrogen sulfide in said regenerable primary solvent thereby resulting in said regenerable primary solvent being in a rich state and a cleaned gas suitable for one of incineration, venting, flaring, and capturing for use as a fuel, and wherein said primary gas treatment system cycles said regenerable primary solvent in said rich state to said regenerator wherein said regenerator removes said hydrogen sulfide from said regenerable solvent resulting in an enriched sour gas stream suitable for one or more further processing methods and said regenerable primary solvent in said lean state that is cycled back to said absorber, said primary gas treatment system having a maximum sour gas treatment capacity, said supply of sour gas and said enriched sour gas stream having one or more chemical and material properties, said one or more chemical and material properties having one or more variances, and wherein said primary sour gas treatment system having one or more limits on the capability to treat said one or more variances of said one or more chemical and material properties. AAPA preamble does not teach a secondary unit. Dickinson disclose an auxiliary sour gas treatment system (para [0089]: secondary) having a scrubber for scrubbing the contaminants such as hydrogen sulfide (para [0056], scrubber 37). Accordingly, it would have been obvious to a person having ordinary skill in the art to use a secondary or auxiliary treatment system to improve the quality of the sour gas or to treat a diverted sour gas stream during a time period when the processing steps are inoperable in the primary system.

Therefore, inventions of Group I-III lack unity under PCT Rule 13.