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(81) Designated States (unless otherwise indicated, for every
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DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP,
KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD,

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ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

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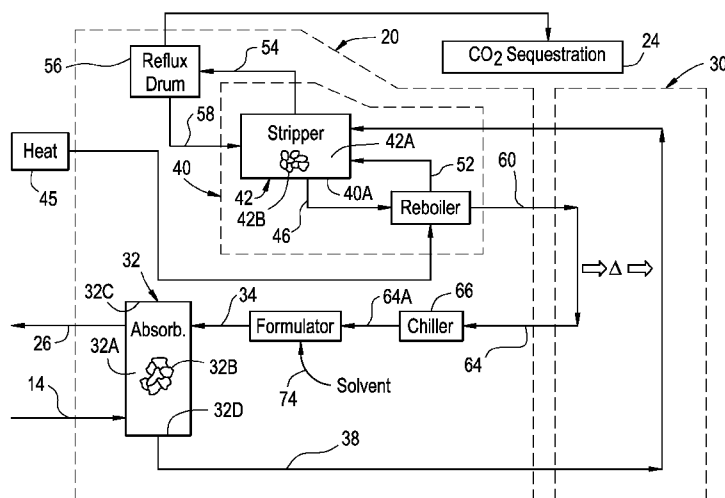
- with international search report (Art. 21(3))

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23 January 2014

(54) Title: FLUE GAS TREATMENT SYSTEM WITH AMMONIA SOLVENT FOR CAPTURE OF CARBON DIOXIDE

FIG. 2



(57) Abstract: A system for treating a flue gas from a combustion process comprises an absorber vessel configured to receive an aqueous ammonia solvent stream lean in CO₂ and a flue gas stream having CO₂, the aqueous ammonia solvent stream and the flue gas stream in contact in the absorber vessel in a counter-current arrangement to provide an outlet stream rich in CO₂; a desorber configured to strip the CO₂ from the outlet stream rich in CO₂ from the absorber vessel at a temperature less than 100 degrees C and to return the resultant aqueous ammonia solvent stream lean in CO₂ to the absorber vessel; a source of heat configured to supply heat to the desorber; and a CO₂ sequestration system for sequestering CO₂ stripped by the desorber.

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER

INV. B01D53/14 B01D53/62 B01D53/78 F23J15/00
ADD.

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)

B01D F23J

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

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

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2008/307968 A1 (KANG KI JOON [KR] ET AL) 18 December 2008 (2008-12-18)	1-3,8,9, 13-15
Y	figure 1 paragraph [0002] paragraph [0038] paragraph [0077]	4,5,10, 16-18
X	----- WO 2006/022885 A1 (GAL ELI [US]) 2 March 2006 (2006-03-02) "Summary of Invention"; page 4	1-3,8,9, 13-15
Y	----- WO 2009/091437 A1 (POWERSPAN CORP [US]; MCLARNON CHRISTOPHER [US]; DUNCAN JOANNA [US]; AL) 23 July 2009 (2009-07-23) figure 22 page 22, paragraph "ammonia capture" page 5, paragraph 4 ----- -/-	4,16,17



Further documents are listed in the continuation of Box C.



See patent family annex.

* 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

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"&" document member of the same patent family

Date of the actual completion of the international search

25 October 2013

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31/10/2013

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2007/148068 A1 (BURGERS KENNETH L [US] ET AL) 28 June 2007 (2007-06-28) figure 1	4,16,17
Y	----- EP 2 230 000 A1 (ALSTOM TECHNOLOGY LTD [CH]) 22 September 2010 (2010-09-22) paragraph [0015] paragraph [0079] paragraph [0081] -----	5,10,18

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2013/052496

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2008307968 A1	18-12-2008	JP 2008296216 A US 2008307968 A1	11-12-2008 18-12-2008
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2013/052496

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:

see additional sheet

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 an 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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 2, 3, 9, 14, 15(completely); 1, 8, 13(partially)

System and method for CO₂ removal from a flue gas comprising heat exchanger for cooling down lean aqueous ammonia solvent stream before entering absorber column

2. claims: 4, 16, 17(completely); 1, 8, 13(partially)

System and method for CO₂ removal from a flue gas comprising adjusting the composition of the aqueous ammonia solvent stream

3. claims: 5-7, 10-12, 18, 19(completely); 1, 8, 13(partially)

System and method for CO₂ removal from a flue gas wherein the desorber comprises a reboiler operating between 1 and 10 bar a
