



- (51) **International Patent Classification:**
C10J 3/00 (2006.01) *C10B 57/10* (2006.01)
- (21) **International Application Number:**
PCT/US2012/039598
- (22) **International Filing Date:**
25 May 2012 (25.05.2012)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
13/152,878 3 June 2011 (03.06.2011) US
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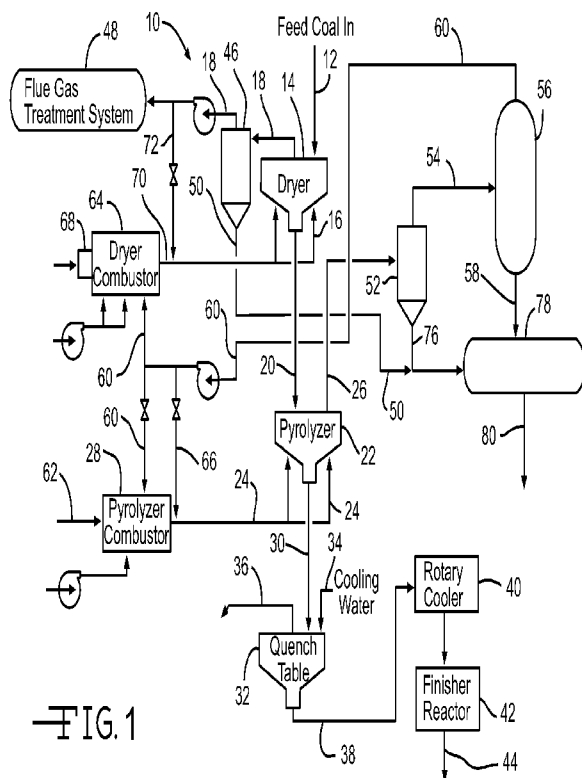
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(81) **Designated States** (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, 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, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) **Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,

[Continued on next page]

(54) **Title:** COAL PROCESSING TO UPGRADE LOW RANK COAL HAVING LOW OIL CONTENT



(57) **Abstract:** A method of treating untreated low calorific coal containing moisture and organic volatiles includes feeding untreated coal to a dryer, and drying the coal. The dried coal is subjected to a pyrolyzing step where oxygen-deficient gases are brought into contact with the coal, thereby lowering the volatile content of the coal and producing a stream of pyrolysis effluent gases. The pyrolysis effluent gases are subjected to a separation process to separate lean fuel gases from liquids and tars, wherein the separation process removes less than about 20 percent of the pyrolysis effluent gases as the liquids and tars, with the remainder being the lean fuel gases. The lean fuel gases are returned to the dryer combustor, the pyrolyzer combustor, or the pyrolyzer.



TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

(88) Date of publication of the international search report:

28 March 2013

A. CLASSIFICATION OF SUBJECT MATTER*C10J 3/00(2006.01)i, C10B 57/10(2006.01)i*

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)

C10J 3/00; C10J 3/46; F26B 3/08; C10B 21/20; C10B 47/00; C10G 1/00; C10L 9/08

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: coal, pyrolysis, effluent gas

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2011-0011719 A1 (RINKER FRANKLIN G.) 20 January 2011 See paragraph [0037] - paragraph [0038] and figure 1	1-20
A	US 04263124 A (WICKSTROM; GARY H. et al.) 21 April 1981 See column 4, line 42 - column 8, line 12 and figures 1-2	1-20
A	US 04322222 A (SASS; ALLAN) 30 March 1982 See column 2, line 13 - column 6, line 58 and figure 1	1-20
A	US 05087269 A (CHA; CHANG Y. et al.) 11 February 1992 See abstract and figure 1	1-20



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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"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

"&" document member of the same patent family

Date of the actual completion of the international search

27 DECEMBER 2012 (27.12.2012)

Date of mailing of the international search report

28 DECEMBER 2012 (28.12.2012)

Name and mailing address of the ISA/KR

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Facsimile No. 82-42-472-7140

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/039598

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US 04263124 A	21.04.1981	None	
US 04322222 A	30.03.1982	US 04229185 A	21.10.1980
US 05087269 A	11.02.1992	None	