

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
2 March 2006 (02.03.2006)

PCT

(10) International Publication Number  
WO 2006/022687 A3

(51) International Patent Classification:  
B01J 7/00 (2006.01) B01J 8/00 (2006.01)

(21) International Application Number:  
PCT/US2004/025254

(22) International Filing Date: 4 August 2004 (04.08.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
10/911,348 3 August 2004 (03.08.2004) US

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

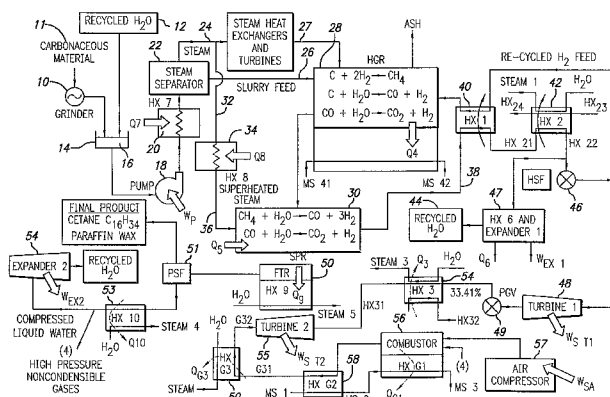
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:  
— with international search report

(88) Date of publication of the international search report:  
3 January 2008

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: STEAM PYROLYSIS AS A PROCESS TO ENHANCE THE HYDRO-GASIFICATION OF CARBONACEOUS MATERIALS



(57) Abstract: A process and apparatus for producing a synthesis gas for use as a gaseous fuel or as feed into a Fischer-Tropsch reactor to produce a liquid fuel in a substantially self-sustaining process. In one embodiment, a slurry of particles of carbonaceous material in water, and hydrogen from an internal source, are fed into a hydro-gasification reactor under conditions whereby methane rich producer gases are generated and fed into a steam pyrolytic reformer under conditions whereby synthesis gas comprising hydrogen and carbon monoxide are generated. A portion of the hydrogen generated by the steam pyrolytic reformer is fed through a hydrogen purification filter into the hydro-gasification reactor, the hydrogen therefrom constituting the hydrogen from an internal source. The remaining synthesis gas generated by the steam pyrolytic reformer is either used as fuel for a gaseous fueled engine to produce electricity and/or process heat or is fed into a Fischer-Tropsch reactor under conditions whereby a liquid fuel is produced. Molten salt loops are used to transfer heat from the hydro-gasification reactor, and Fischer Tropsch reactor if liquid fuel is produced, to the steam generator and the steam pyrolytic reformer. In another embodiment of the invention, carbonaceous material can be heated simultaneously in the presence of both hydrogen and steam to undergo steam pyrolysis and hydro-gasification in a single step.



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# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/25254

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC: **B01J 7/00( 2006.01),8/00( 2006.01)**

USPC: **48/127.9,127.3,197R;422/198,200;423/447.9;518/700**

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)  
 U.S. : 48/127.9, 127.3, 197R; 422/198, 200; 423/ 447.9; 518/700

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)  
 Search terms: hydrogasification same reform\$5 same particsize same biomass

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US RE 35,377 A (STEINBERG et al) 12 November 1996 (12.11.1996), Figure 2, Column 3, lines 1-9, Column 1, lines 10-14 , Column 4, lines 8-22.	1-3 and 5-14 ----- 4, 15-44
Y	US 6,350,288 B1 (HIRAYAMA et al) 26 February 2002 (26.02.2002), Column 1, lines 46-50.	1,4
Y	US 6,225,358 B1 (KENNEDY) 01 May 2001 (01.05.2001), Column 1, lines 20-58.	1-44

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	"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
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"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search

24 September 2007 (24.09.2007)

Date of mailing of the international search report

12 OCT 2007

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