

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
20 April 2023 (20.04.2023)



(10) International Publication Number
WO 2023/064089 A1

(51) International Patent Classification:

C01B 3/24 (2006.01) *C01B 3/02* (2006.01)
C01B 3/34 (2006.01) *C01B 3/22* (2006.01)

(21) International Application Number:

PCT/US2022/044719

(22) International Filing Date:

26 September 2022 (26.09.2022)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/256,264 15 October 2021 (15.10.2021) US

(71) Applicant: **DG FUELS, LLC** [US/US]; 1025 CONNEC-
TICUTE AVE NW, SUITE 507, WASHINGTON, District
of Columbia 20036 (US).

(72) Inventors: **DARCY, Michael C.**; c/o DG FUELS, LLC,
1025 CONNECTICUTE AVE NW, SUITE 507, Washing-
ton, District of Columbia 20036 (US). **HORNER, Michael
W.**; c/o DG FUELS, LLC, 1025 CONNECTICUTE AVE
NW, SUITE 507, Washington, District of Columbia 20036
(US). **FREERKS, Robert L.**; c/o DG FUELS, LLC, 1025
CONNECTICUTE AVE NW, SUITE 507, Washington,
District of Columbia 20036 (US). **FROST, Lyman Joseph**;
c/o DG FUELS, LLC, 1025 CONNECTICUTE AVE NW,
SUITE 507, Washington, District of Columbia 20036 (US).
SALINAS, Juan Francisco Percy; c/o DG Fuels, LLC,
1025 CONNECTICUTE AVE NW, SUITE 507, Washing-
ton, District of Columbia 20039 (US). **MONTOTO, Daniel
Benjamin**; c/o DG FUELS, LLC, 1025 CONNECTICUTE
AVE NW, SUITE 507, Washington, District of Columbia
20036 (US).

(54) Title: PROCESSES AND SYSTEMS FOR PRODUCING HYDROCARBON FUELS HAVING HIGH CARBON CON-
VERSION EFFICIENCY

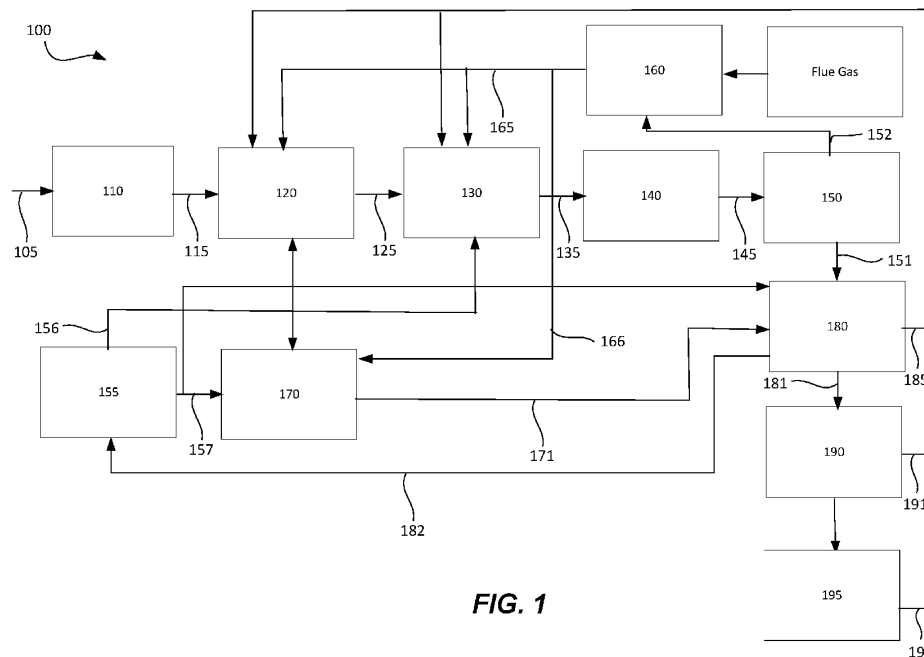


FIG. 1

(57) Abstract: The present disclosure relates to a processes and systems for producing fuels from biomass with high carbon conversion efficiency. The processes and systems described herein provide a highly efficient process for producing hydrocarbons from biomass with very low Green House Gas (GHG) emissions using a specific combination of components, process flows, and recycle streams. The processes and systems described herein provide a carbon conversion efficiency greater than 95 % with little to no GHG in the flue gas due to the novel arrangement of components and utilizes renewable energy to provide energy to some components. The system reuses water and carbon dioxide produced in the process flows and recycles naphtha and tail gas streams to other units in the system for additional conversion to syngas to produce hydrocarbon- based fuels.

[Continued on next page]

WO 2023/064089 A1

(74) **Agent: THOMAS, Christopher** et al.; KILPATRICK
TOWNSEND & STOCKTON LLP, 1100 Peachtree Street,
Suite 2800, Atlanta, Georgia 30309 (US).

(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, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, 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, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, 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, KM, 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))*

Published:

- *with international search report (Art. 21(3))*
- *with amended claims (Art. 19(1))*