

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
28 September 2006 (28.09.2006)

PCT

(10) International Publication Number
WO 2006/102534 A2

(51) International Patent Classification:
C10G 47/00 (2006.01) **C10G 45/02** (2006.01)

(21) International Application Number:
PCT/US2006/010639

(22) International Filing Date: 23 March 2006 (23.03.2006)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
11/089,477 24 March 2005 (24.03.2005) US

(71) Applicant (for all designated States except US):
PROCESS DYNAMICS, INC. [US/US]; 2434 Deane
Solomon Road, Rayetteville, Arkansas 72704 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **ACKERSON, Michael, D.** [US/US]; 3241 Nottingham, Fayetteville, Arkansas 72701 (US). **BYARS, Michael** [US/US]; 2642 E. Golden Oaks Driv, Fayetteville, Arizona 72701 (US).

(74) Agent: **BERGEN, Grady, K.**; 3333 LEE PARKWAY, Suite 600, Dallas, Texas 75219 (US).

(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, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

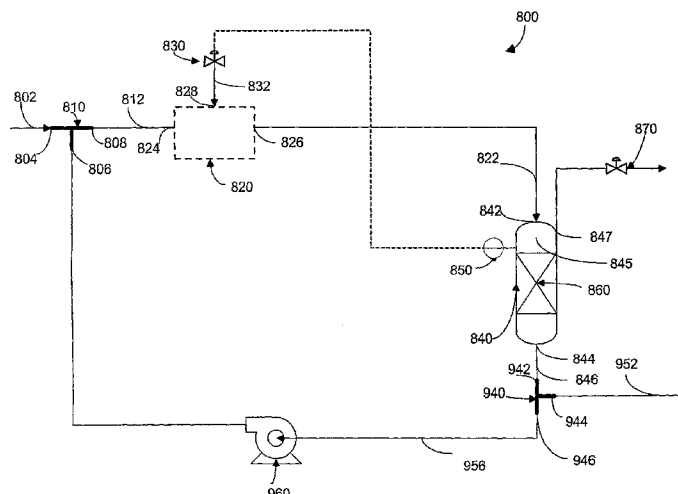
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, 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:

— without international search report and to be republished upon receipt of that report

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: CONTROL SYSTEM METHOD AND APPARATUS FOR CONTINUOUS LIQUID PHASE HYDROPROCESSING



(57) Abstract: A continuous liquid phase hydroprocessing process, apparatus and process control systems, where the need to circulate hydrogen gas through the catalyst is eliminated. By mixing and/or flashing the hydrogen and the oil to be treated in the presence of a solvent or diluent in which the hydrogen solubility is high relative to the oil feed, all of the hydrogen required in the hydroprocessing reactions may be available in solution. The oil/diluent/hydrogen solution can then be fed to a plug flow reactor packed with catalyst where the oil and hydrogen react. No additional hydrogen is required; therefore, the large trickle bed reactors can be replaced by much smaller tubular reactors. The amount of hydrogen added to the reactor can be used to control the liquid level in the reactor or the pressure in the reactor.