



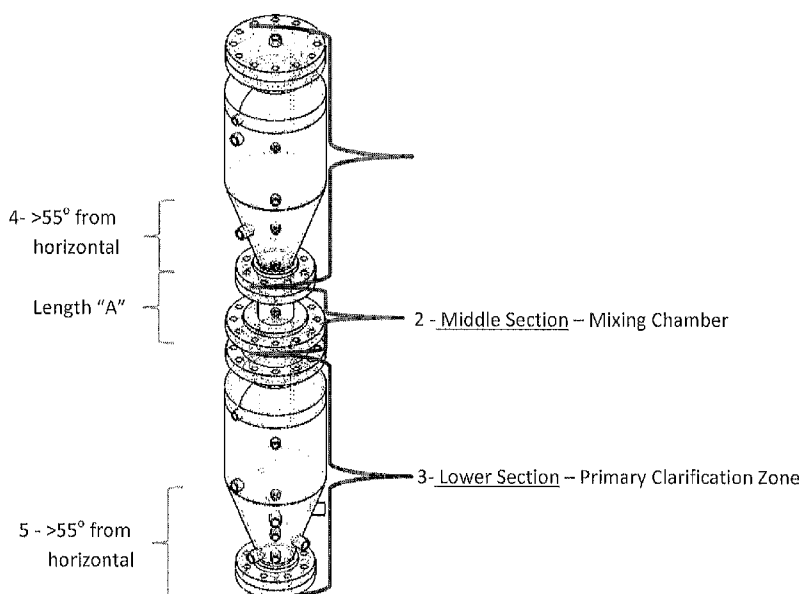
- (51) **International Patent Classification:**
C10C 3/18 (2006.01) **C10C 3/08** (2006.01)
B01D 11/00 (2006.01)
- (21) **International Application Number:** PCT/CA2014/050130
- (22) **International Filing Date:** 24 February 2014 (24.02.2014)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
 61/768,870 25 February 2013 (25.02.2013) US
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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, BN, 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, IR, IS, JP, KE, KG, 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, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, 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, 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).

Published:

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

(54) **Title:** IMPROVED SEPARATION OF SOLID ASPHALTENES FROM HEAVY LIQUID HYDROCARBONS USING NOV-EL APPARATUS AND PROCESS ("IAS")

Figure 1



(57) **Abstract:** An apparatus and process is provided for improved asphaltene separation from heavy hydrocarbon or bitumen with low process complexity through mass transfer using solvent and counter-current flows, with three sections: an upper DAO/solid-asphaltene separation zone, a middle solvent mixing and segregation zone, and a bottom clarification zone. Solvent mixed with heavy hydrocarbon forms a process feed introduced to the process vessel's upper zone and exposed to counter-current solvent removing DAO from solid asphaltene particles in the feed, the particles fall through the middle zone and are mixed with introduced solvent, which introduced solvent segregates DAO-rich solution in the upper zone (for extraction from that zone) from solvent-rich mixtures in the middle mixing and lower clarification zones. Solvent flows and precipitate movement are controlled to optimize mass transfer in process, resulting in high DAO recovery and dry, solid asphaltene product.