



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : D06F 43/08, 43/00, B08B 7/00		A1	(11) International Publication Number: WO 00/70141
			(43) International Publication Date: 23 November 2000 (23.11.00)
(21) International Application Number: PCT/US00/13103 (22) International Filing Date: 12 May 2000 (12.05.00) (30) Priority Data: 09/312,556 14 May 1999 (14.05.99) US (71) Applicant (for all designated States except US): MICELL TECHNOLOGIES, INC. [US/US]; 7516 Precision Drive, Raleigh, NC 27613 (US). (72) Inventors; and (75) Inventors/Applicants (for US only): DEYOUNG, James, P. [US/US]; 106 Lochridge, Durham, NC 27713 (US). ROMACK, Timothy, J. [US/US]; 5810 Forest Ridge Drive, Durham, NC 27713 (US). MCCLAIN, James, B. [US/US]; 8008 Chadbourne Court, Raleigh, NC 27613 (US). (74) Agents: SIBLEY, Kenneth, D. et al.; Myers, Bigel, Sibley, & Sajovec, P.A., P.O. Box 37428, Raleigh, NC 27627 (US).		(81) Designated States: AE, AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.	

(54) Title: DETERGENT INJECTION SYSTEMS FOR CARBON DIOXIDE CLEANING APPARATUS

(57) Abstract

A system for the controlled addition of detergent formulations and the like to a carbon dioxide cleaning apparatus comprises: a high pressure wash vessel (11); an auxiliary vessel (12); a drain line (13) connecting the auxiliary vessel to the wash vessel; optionally but preferably, a separate vent line (14) connecting the auxiliary vessel to the wash vessel; a detergent reservoir (15); and a detergent supply line (16) connecting the detergent reservoir to the auxiliary vessel. An advantage of this apparatus is that, because the detergent formulation can be pumped into the auxiliary vessel in a predetermined aliquot or amount, which predetermined aliquot or amount can then be transferred into the wash vessel where it combines with the liquid carbon dioxide cleaning solution, the detergent formulation can be added to the cleaning solution in a more controlled or accurate manner.

