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United States Patent [19]

Roberts et al.

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[54] **METHODS AND APPARATUS FOR SEPARATING FISCHER-TROPSCH CATALYSTS FROM LIQUID HYDROCARBON PRODUCT**

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[*] Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

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Related U.S. Application Data

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[51] **Int. Cl.**[7] **C07C 27/00**; C07C 1/02; B01J 20/34

[52] **U.S. Cl.** **518/710**; 518/700; 518/724; 252/373; 502/22; 502/29; 502/326

[58] **Field of Search** 518/700, 724, 518/710; 252/373; 502/22, 29, 326

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[57] **ABSTRACT**

A method of separating a Fischer-Tropsch catalyst from the output slurry of a Fischer-Tropsch bubble column reactor, where the slurry comprises Fischer-Tropsch catalyst particles and liquid hydrocarbon product is disclosed. The method comprises contacting a compressed hydrocarbon solvent (e.g., a supercritical hydrocarbon solvent, or liquid hydrocarbon solvent which may be at near supercritical conditions) with the output slurry at a temperature and pressure where the liquid hydrocarbon product is soluble in the solvent to form a concentrated slurry phase containing the catalyst particles, and an enriched solvent phase containing liquid hydrocarbon product. This contacting step is then followed by the step of separating the concentrated slurry from the enriched solvent. Apparatus for carrying out the method of the invention is also disclosed.

25 Claims, 2 Drawing Sheets