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Richardson

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(54) **SYSTEM AND METHOD FOR LIQUID-ORGANIC PARTICLE SEPARATION**

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,066,407 A	11/1991	Furlow
5,766,484 A	6/1998	Petit et al.
7,297,284 B2	11/2007	Owen et al.
7,328,809 B2	2/2008	Gigas et al.
8,915,380 B2	12/2014	Sowerby et al.
9,308,473 B2	4/2016	Haywood et al.
10,344,466 B2	7/2019	Kent
10,858,721 B1	12/2020	Richardson

FOREIGN PATENT DOCUMENTS

KR	101651081	8/2016
KR	101764065	8/2017

OTHER PUBLICATIONS

Cross Section of Typical Grease Interceptor—https://www.researchgate.net/figure/245301083_fig1_Fig-1-Cross-section-of-typical-grease-interceptor—Nov. 13, 2017.

(Continued)

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(57) **ABSTRACT**

The present invention provides a method and system for separating a liquid from organic particles. The mixer-settler extraction cell includes a flow distributor. The flow distributor comprises a chevron-shaped series of welded plates, which separates the incoming flow stream of liquid and organic particles from one another.

18 Claims, 7 Drawing Sheets

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