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(54) **REDUCED SALT PRECIPITATION IN CARBOHYDRATE CONTAINING BINDER COMPOSITIONS**

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2008/0194518	A1*	8/2008	Mookerjee	A01N 27/00 514/55
2010/0222459	A1*	9/2010	Kelly	C08L 5/00 524/17
2012/0037836	A1	2/2012	Hansen	
2012/0205572	A1	8/2012	Hampson et al.	

* cited by examiner

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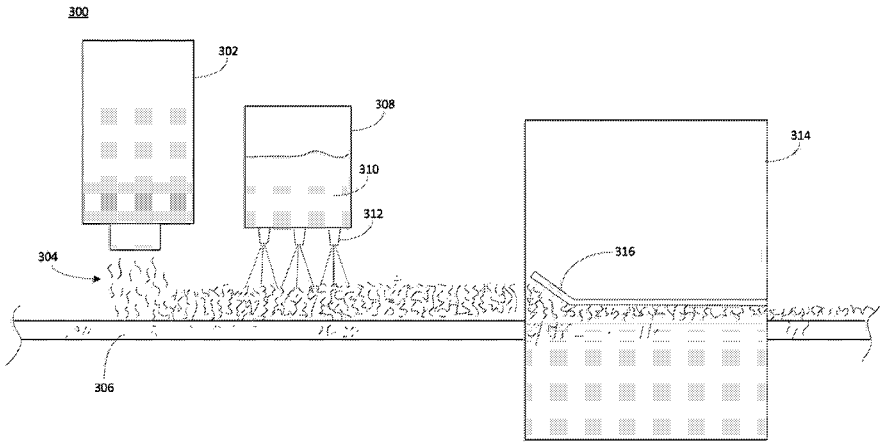
(57) **ABSTRACT**

Aqueous binder compositions with reduced rates of salt precipitation are described. The compositions may include a carbohydrate and a sequestrant for sequestering one or more multivalent ions (e.g., Ca^{2+}, Mg^{2+}, Ba^{2+}, Al^{3+}, Fe^{2+}, Fe^{3+}, etc.). The sequestrant reduces a precipitation rate for the multivalent ions from the aqueous binder composition. Methods of reducing salt precipitation from a binder composition are also described. The methods may include the steps of providing an aqueous binder solution having one or more carbohydrates. They may also include adding a sequestrant for one or more multivalent ions to the aqueous binder solution. The sequestrant reduces a precipitation rate for the multivalent ions from the binder composition.

21 Claims, 4 Drawing Sheets