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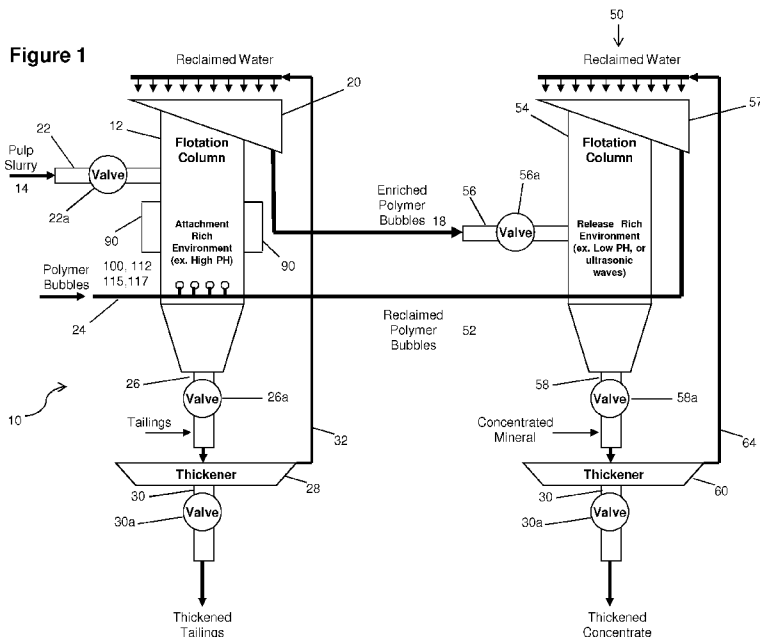
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[Continued on next page]

(54) Title: TECHNIQUES FOR TRANSPORTING SYNTHETIC BEADS OR BUBBLES IN A FLOTATION CELL OR COLUMN



(57) Abstract: Apparatus featuring synthetic bubbles or beads and a flotation stage. The synthetic bubbles or beads are configured with a polymer or polymer-based material functionalized to attach to the valuable material in a mixture to form at least some enriched synthetic bubbles or beads having the valuable material attached thereto, and also configured to be transported through the mixture based at least partly on a characteristic of the synthetic bubbles or beads. The flotation stage has the mixture containing valuable material, and is configured to receive the synthetic bubbles or beads and to provide the at least some enriched synthetic bubbles or beads having the valuable material attached thereto based at least partly the characteristic of the synthetic bubbles or beads.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 12/39658

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - B01D 35/05 (2013.01)
USPC - 210/175
 According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC(8): B01D 35/05 (2013.01)
 USPC: 210/175

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
 IPC(8): B01D 35/05 (2013.01)
 USPC: 210/175, 176, 198.1, 198.2, 222, 263, 500, 1,500, 21,500, 25,502, 1,695, 702, 703, 737, 767, 777; 299/7 (keyword limited; terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 PatBase; Google Scholar; Google Patent; Google; PubWEST (PGPB, USPT, USOC, EPAB, JPAB) Search Terms Used: hydrophobic hydrophilic functional float buoyant density sink settle skim waste slurry particle micro-particle separate categorization column synthetic beads bubbles flotation cell recover coating minerals temperature density attach mixture etc.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X — Y	US 2009/0206040 A1 (Berg et al.) 20 August 2009 (20.08.2009), entire document, especially para [0012]-[0026], [0029], [0033], [0034], [0036]-[0048], [0051], [0052]-[0054], [0056]-[0060], [0065], [0068]-[0074], [0119]	1-20, 22, 24-33 <hr/> 21, 23
Y	US 2010/0200510 A1 (Domke et al.) 12 August 2010 (12.08.2010), para [0008]	21, 23
A	US 2010/0285606 A1 (Phillips et al.) 11 November 2010 (11.11.2010) entire document	1-33
A	US 2010/0294725 A1 (Bush et al.) 25 November 2010 (25.11.2010) entire document	1-33
A	US 2008/0156702 A1 (Duyvesteyn) 03 July 2008 (03.07.2008) entire document	1-33
A	WO 2010/098786 A1 (Soane Energy, LLC) 02 September 2010 (02.09.2010) entire document	1-33
P, A	US 2011/0131873 A1 (Soane et al.) 09 June 2011 (09.06.2011) entire document	1-33

Further documents are listed in the continuation of Box C.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

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