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(54) **POLYOLEFIN-BASED RESIN EXPANDED BEADS COMPRISING INORGANIC FILLERS**

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(58) **Field of Classification Search**

USPC 428/407, 403

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,207,378	A *	6/1980	Klein	B01D 39/04 428/402
4,521,482	A *	6/1985	Arai et al.	428/336
6,027,806	A *	2/2000	Abe et al.	428/407

(Continued)

FOREIGN PATENT DOCUMENTS

EP	1 593 475 A1	11/2005
EP	2 447 311 A1	5/2012

(Continued)

OTHER PUBLICATIONS

Nutter & Benning, Filled Polyethylene Foams, J. of Cellular Plastics, 1966.*

(Continued)

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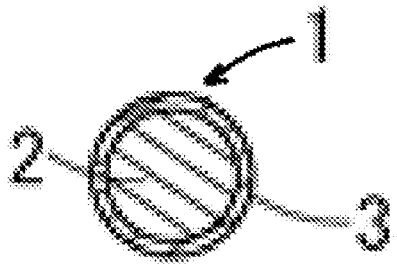
(57) **ABSTRACT**

An inorganic filler-containing, polyolefin-based resin expanded bead having an expanded core layer of a first polyolefin-based resin, and a cover layer of a second polyolefin-based resin that covers the expanded core layer, wherein a weight ratio of the cover layer to the expanded core layer is 1:99 to 20:80, the expanded core layer contains an inorganic filler in a weight percentage amount of 5 to 90%, and the cover layer contains no inorganic filler or contains an inorganic filler in a weight percentage amount lower than that in the expanded core layer.

5 Claims, 2 Drawing Sheets