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Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

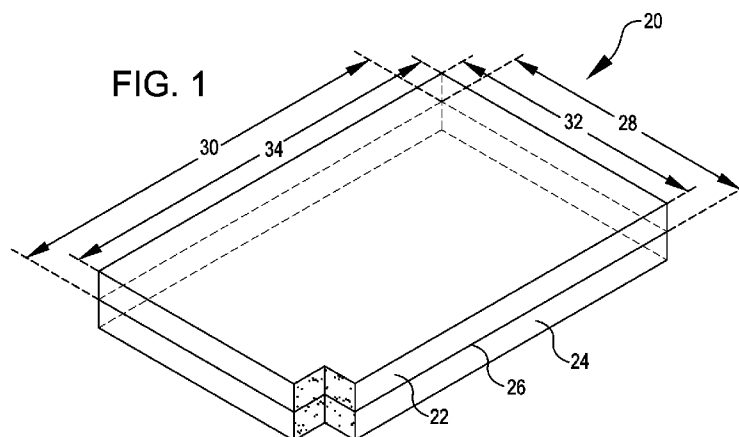
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(54) **Title:** A MICROSTRUCTURE FOR FUSION BONDED THERMOPLASTIC POLYMER MATERIAL, AND RELATED METHODS



(57) **Abstract:** A material comprises a first layer that includes a thermoplastic polymer having a microstructure that includes a plurality of closed cells, each cell containing a void and each cell having a maximum dimension extending across the void within the cell that ranges between 1 micrometer and 200 micrometers long. The material also includes a second layer including a thermoplastic polymer having a microstructure that includes a plurality of closed cells, each cell containing a void and each cell having a maximum dimension extending across the void within the cell that ranges between 1 micrometer and 200 micrometers long. The material also includes an interface layer formed by fusion bonding the first layer to the second layer, the interface layer having a microstructure that includes a plurality of closed cells, each cell containing a void and each cell having a maximum dimension extending across the void within the cell that is at least 100 micrometers long.



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 12/22963

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - B29C 65/00, 65/18 (2012.01)

USPC - 156/228; 156/304.2

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) - B29C 65/00, 65/18 (2012.01)

USPC - 156/228; 156/304.2

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
 Patents, Non-Patent Literature. USPC - 156/304.6; 156/309.9; 156/499; 156/580; 156/583.8; 428/314.4; 428/315.5; 428/316.6. Search term limited.

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 UPSTO PubWEST; Google. Search terms: bond, cell, closed, convolute, cup, diameter, different, dimension, dissimilar, foam, form, forming, fused, fusion, join\$, laminat\$, lap, layer\$, over, overlap, plastic, polymer, polymer\$, seal\$, seam\$, size, thermal\$, thermoplastic, wind\$, wound

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 2009/0104420 A1 (Nadella et al.) 23 April 2009 (23.04.2009) para [0002], [0012], [0013], [0027], [0029], [0032], [0050]; fig. 1, 2, 5	1, 3-13, 17 ----- 2, 14-16
Y	US 2010/0028654 A1 (Takase et al.) 4 February 2010 (04.02.2010) para [0103]	2
Y	US 2004/0005449 A1 (Sugimoto et al.) 8 January 2004 (08.01.2004) Fig. 3, para [0062]	14-16
Y	US 3,617,311 A (Bettle et al.) 2 November 1971 (02.11.1971) Fig. 1, 5; col 2 ln 22-27	14-16

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"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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"&" document member of the same patent family

Date of the actual completion of the international search

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