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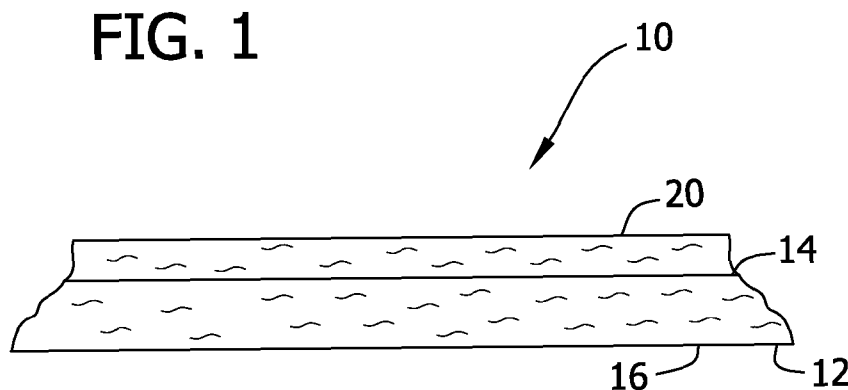
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(54) Title: COMPOSITE FILTER MEDIA



(57) Abstract: A composite filter media structure includes, in an exemplary embodiment, a base substrate that includes a nonwoven synthetic fabric formed from a plurality of fibers with a spunbond process. The base substrate has a filtration efficiency of about 35% to less than 50%, measured in accordance with EN 1822 (1998) test procedure A nanofiber layer is deposited on one side of the base substrate. The composite filter media structure has a minimum filtration efficiency of about 70%, measured in accordance with EN 1822 (1998) test procedure.



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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2009/052567

A. CLASSIFICATION OF SUBJECT MATTER INV. B01D39/16 ADD.		
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) B01D		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 048 335 A1 (FIBERMARK GESSNER GMBH & CO [DE]) 2 November 2000 (2000-11-02) paragraphs [0008] - [0013], [0015], [0016]; claims 1-4	1, 4, 5, 14, 17, 18
X	US 2007/074628 A1 (JONES DAVID C [US] ET AL) 5 April 2007 (2007-04-05) paragraphs [0019], [0021]; claims 1, 6-8, 12-14	1, 4, 5, 14, 17, 18
X	US 2006/137317 A1 (BRYNER MICHAEL A [US] ET AL) 29 June 2006 (2006-06-29) claims; examples paragraph [0017]	1, 4, 5, 14, 17, 18
X	WO 2004/069378 A2 (SANDLER HELMUT HELSA WERKE [DE]; CZADO WOLFGANG [DE]) 19 August 2004 (2004-08-19) claims 1, 9, 12	1, 4, 5
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents : *A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *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 *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 *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 *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family		
Date of the actual completion of the international search 20 April 2010		Date of mailing of the international search report 26/04/2010
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Plaka, Theophano

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/052567

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1, 4, 5, 14, 17, 18

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1, 4, 5, 14, 17, 18

Composite filter media structure with spunbond base substrate and nanofiber layer., filter element with said filter media.

2. claims: 2, 16

Base substrate with dual layer of round and trilobal fibers

3. claims: 3, 15

Electrically neutral fibers.

4. claims: 6, 19

Base substrate with basis weight of 100g/sqm to 300g/sqm.

5. claims: 7, 8, 20, 21

Nanofibers of specific diameter and basis weight.

6. claims: 9, 22

Bond are pattern of base substrate.

7. claims: 10, 23

Diameter of fibers of base substrate.

8. claims: 11-13, 24-26

Resistance and quality factor of composite filter media.

9. claim: 27

Pleated filter element.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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