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D06M 13/352 (2006.01) **A61F 13/539** (2006.01)
D06M 16/00 (2006.01) **A61F 13/514** (2006.01)
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A61F 13/84 (2006.01)

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(54) **Title:** WASH-DURABLE, FLUID ABSORBENT SUBSTRATE WITH ANTIMICROBIAL PROPERTIES AND/OR IMPROVED WASHABILITY, AND HYGIENE PRODUCT SUCH AS REUSABLE SANITARY NAPKIN

(57) **Abstract:** The present invention is directed to a substrate, in particular textile material to which one or more antimicrobial and/or hydrophilic and/or stain release agents are adhered. The agent(s) is/are adhered to the substrate in such a manner that they are not released from the textile even if the textile is wetted or washed, so that the textile is reusable. Washability and/or usability of the textile are improved where one or more hydrophilic and/or stain release agents are adhered to the textile. The substrate can be used, e.g., in a reusable sanitary napkin or other hygiene product. The structure of the hygiene product is disclosed, together with a process of attaching the different layers of the hygiene product together by ultrasonic welding. The invention further relates to a method of finishing a substrate by applying and binding antimicrobial and/or hydrophilic and/or stain release agents to the substrate so that the agents are essentially irreversibly adhered to the finished substrate.



INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER				
INV.	A61F13/64	D06M11/13	A01N25/24	A01N25/34
	A01N47/44	A01N59/16	A61L2/16	D06M13/256
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				A61F13/84
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)				
A61F D06M A01N A61L A62B				
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 practicable, search terms used)				
EPO-Internal, WPI Data				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category*	Citation of document, with indication, where appropriate, of the relevant passages			Relevant to claim No.
X	WO 2015/028852 A1 (GREEN IMPACT HOLDING AG [CH]) 5 March 2015 (2015-03-05) page 3, lines 7-12; claims 1-15; examples 2,3,4,18 page 5, lines 12-20 page 9, last paragraph - page 10, paragraph first -----			1-4,7, 12-14,16
A	WO 2014/160906 A2 (DU PONT [US]) 2 October 2014 (2014-10-02) pages 20-22 -----			7
A	US 2008/005852 A1 (HU CHENG [US] ET AL) 10 January 2008 (2008-01-10) example 10 ----- -/--			7
☒ Further documents are listed in the continuation of Box C. ☒ 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 application or patent 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			Date of mailing of the international search report	
20 June 2017			10/07/2017	
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 Barathe, Rainier	

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International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/062010 A1 (FANG XINGGAO [US] ET AL) 24 March 2005 (2005-03-24) abstract claims 1, 5, 24, 29 -----	1,2
X	US 5 968 599 A (JUNG UN DU [KR] ET AL) 19 October 1999 (1999-10-19) examples 1,2; table 1 -----	1
A	WO 2011/101857 A2 (KHANDELWAL SANJEEV [IN]; OMRAY PRATIBHA [IN]; SWAMI SANJEEV [IN]) 25 August 2011 (2011-08-25) table 3 -----	1
X	WO 2012/047650 A1 (EULIE LLC [US]; PNG ENQIN EUNICE [US]; SYGIEL JULIA [US]; WYNER DANIEL) 12 April 2012 (2012-04-12) paragraph [0052]; figures; table A -----	17,23
X	JP 2009 136417 A (KAO CORP) 25 June 2009 (2009-06-25) abstract paragraphs [0035] - [0040], [0047] - [0050], [0055] - [0059]; table -----	17,19,23
X	US 2010/050316 A1 (LEONARD W ALLEN [US] ET AL) 4 March 2010 (2010-03-04) paragraph [0059]; figures 4,11,12 -----	17,19,23
X	JP 2012 090891 A (KAO CORP) 17 May 2012 (2012-05-17) paragraphs [0002] - [0037]; figures -----	17,19,23
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A	WO 96/36758 A2 (NEXTEC APPLICATIONS INC [US]) 21 November 1996 (1996-11-21) the whole document -----	17-23

INTERNATIONAL SEARCH REPORT

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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.:

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: 1-16

- A substrate to which one or more stain release agents and one or more antimicrobial agents are adhered,
- wherein the substrate exhibits a reduction value of *Escherichia coli* ATCC 25922 and *Candida albicans* ATCC 10231 measured in accordance with AATCC test method 100 -2012 of at least 99 % within 1 hour of contact time;
- the substrate has a stain release rating, measured in accordance with AATCC test method 130 -2010 , of at least grade 3 ;
- the substrate has a water repellency rating, measured in accordance with AATCC test method 22 -2014 , of at most 50 ;
- the substrate has an oil repellency rating, measured in accordance with AATCC test method 118-2013 , of at most grade 1; and
- the antimicrobial efficiency and the stain release rating are achieved even after at least 25 laundry washes in a laundry washing machine, at 85 ±15 °C for 10 -15 minutes, using non-antimicrobial, non-ionic and non-chlorine containing laundry detergent;
- a process for finishing a substrate, comprising the steps of:
 - treating the substrate using an antimicrobial liquor application process like an exhaustion or padding process, wherein the liquor comprises one or more antimicrobial agents;
 - drying the treated substrate;
 - treating the dried substrate using a stain release liquor application process like an exhaustion or preferably a padding process, wherein the liquor comprises one or more stain release agents which are not capable of increasing the water or oil repellency of the substrate; and
 - curing of the treated substrate, which curing is conducted at least partially at a curing ambient temperature of at least 170 °C;
- a substrate obtainable by the process above;
- the use of the above substrate as a material for forming a towel, kitchen towel, napkin, handkerchief, face mask, floor cleaning mop, wipe, tampon, in wound care, panty, underwear, or bra, or in wound care;
- the hygiene product comprising at least one layer formed by a substrate as defined above and at least one water repellent layer having a water repellency rating of at least 70 when measured in accordance with AATCC test method 22 -2014; and
- one of the hygiene product above, selected from the group consisting of sanitary napkins, panty or underwear liners, nappies, diapers, diaper liners, adult diapers, bed pads, and nursing pads.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

2. claims: 17-23

- A hygiene product comprising :
 - a water repellent layer having a water repellency rating of at least 70 when measured in accordance with AATCC test method 22 -2014, and
 - one or more dispersion layers comprising or consisting of a substrate to which one or more stain release agents are adhered,
- wherein the substrate has:
- a stain release rating, measured in accordance with AATCC test method 130 -2010, of at least grade 3,
 - a water repellency rating, measured in accordance with AATCC test method 22 -2014 , of at most 50, and
 - an oil repellency rating, measured in accordance with AATCC test method 118-2013 , of at most grade 1.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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