(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

PCT

(43) International Publication Date
16 October 2008 (16.10.2008)

(10) International Publication Number
WO 2008/124257 A3

(51) **International Patent Classification:**
***B32B 5/26*** **(2006.01)** ***F41H 5/04*** **(2006.01)**
***B23B 5/28*** **(2006.01)**

(21) **International Application Number:**
**PCT/US2008/057330**

**(22) International Filing Date:** 18 March 2008 (18.03.2008)

**(25) Filing Language:** English

**(26) Publication Language:** English

**(30) Priority Data:**
11/726,068 21 March 2007 (21.03.2007) US

(71) **Applicant** *(for all designated States except US):* **HONEYWELL INTERNATIONAL INC.** [US/US]; Law Department AB/2B, 101 Columbia Road, Morristown, NJ 07962 (US).

**(72) Inventors; and**
**(75) Inventors/Applicants** *(for US only):* **ARVIDSON, Brian D.** [US/US]; 4101 Old Cheshire Drive, Chester, Virginia 23831 (US). **ARDIFF, Henry G.** [US/US]; 8060 Hampton Station Court, Chesterfield, Virginia 23832 (US). **BHATNAGAR, Ashok** [US/US]; 7843 Lake Forest Street, Richmond, Virginia 23235 (US). **HURST, David** A. [US/US]; 11121 Morgan Run Road, Richmond, Virginia 23233 (US). **WAGNER, Lori L.** [US/US]; 7934 Fortress Place, Richmond, Virginia 23231 (US).

**(74) Agent: BEATUS, Carrie;** Honeywell International Inc., Law Department AB/2B, 101 Columbia Road, Morristown, NJ 07962 (US).

(81) **Designated States** *(unless otherwise indicated, for every kind of national protection available):* AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW

**(84) Designated States** *(unless otherwise indicated, for every kind of regional protection available):* ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**
— *with international search report*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

**(88) Date of publication of the international search report:**
27 November 2008

**(54) Title:** COMPOSITE BALLISTIC FABRIC STRUCTURES

**(57) Abstract:** A multilayered composite fabric which comprises (a) a first fabric comprising non-woven unidirectionally oriented fibers in a first resin matrix, the fibers comprising high tenacity fibers, the first fabric comprising first and second surfaces; and (b) a second fabric comprising multi-directionally oriented fibers optionally in a second resin matrix, the second fabric also comprising high tenacity fibers, the second fabric having first and second surfaces, the first surface of the second fabric being bonded to the second surface of the first fabric thereby forming the composite fabric. Also described is a method of making such fabric wherein the second fabric layer is used as a support during the manufacturing process and is thereafter consolidated into a single structure with the first fabric layer.

WO 2008/124257 A3

# INTERNATIONAL SEARCH REPORT

**International** application No
PCT/US2008/057330

**A. CLASSIFICATION OF SUBJECT MATTER**
INV. B32B5/26 B32B5/28 F41H5/04

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)
F41H

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 | US 6 119 575 A (DRAGONE GAETOR J [US] ET AL) 19 September 2000 (2000-09-19)<br>column 1, lines 4-7<br>column 2, lines 35-41<br>column. 3, lines 1-12<br>column 3, 1ines 41,42<br>column 4, lines 31,32<br>column 4, lines 48-53<br>column 5, lines 3,4<br>column 5, lines 30-41<br>col umn 6, lines 17,18<br>example? 1 | 1-23 |
| X | WO 2006/124825 A (HONEYWELL INT INC [US]; BHANTNAGAR ASHOK [US]; MURRAY HAROLD LINDLEY J) 23 November 2006 (2006-11-23)<br>claims 1,21,22<br>example 20 | 1-23 |

-/--

[X] Further documents are listed in the continuation of Box C.

[X] 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 | Date of mailing of the international search report |
|---|---|
| 1 September 2008 | 24/09/2008 |

| Name and mailing address of the ISA/ | Authorized officer |
|---|---|
| European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV RiJsWilk<br>Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,<br>Fax: (+31-70) 340-3016 | Schambeck, Werner |

# INTERNATIONAL SEARCH REPORT

International application No
PCT/US2008/057330

C(Continuatlon). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| X | WO 2005/090072 A (GREENE TWEED INC [US]; TOTO CHRISTOPHER [US]; RAWA GEORGE [US]). 29 September 2005 (2005-09-29) claims 1,7,15 paragraph [0019] | 1-23 |
| X | US 4 536 438 A (BISHOP SARAH M [GB] ET AL) 20 August 1985 (1985-08-20) column 1, lines' 16-19 column 2, lines 21-29 | 1-23 |
| X | WO '99/21697 A (DOW CHEMICAL CO [US]; DOW UNITED TECH COMPOSITE PROD [US]) 6 May 1999 (1999-05-06) claims 15,16 | 1-23 |

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2008/05733O

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| US 6119575 A | 19-09-2000 | NONE | |
| WO 2006124825 A | 23-11-2006 | AR 058423 A1 | 06-02-2008 |
| | | CA 2609070 A1 | 23-11-2006 |
| | | CN 101223030 A | 16-07-2,008 |
| | | EP 1883532 A2 | 06-02-2008 |
| | | KR 20080022109 A | 10-03-2008 |
| WO 2005090072 A | 29-09-2005 | NONE | |
| US 4536438 A | 20-08-1985 | EP 0122024 A2 | 17-10-1984 |
| | | ES 8602483 A1 | 16-03-1986 |
| | | JP 59196238 A | 07-11-1984 |
| WO 9921697 A | 06-05-1999 | AU 9591398 A | 17-05-1999 |
| | | DE 69814129 D1 | 05-06-2003 |
| | | DE 69814129 T2 | 01-04-2004 |
| | | EP 1027206 A1 | 16-08-2000 |
| | | US 6096669 A | 01-08-2000 |