

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

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
14 May 2010 (14.05.2010)

(10) International Publication Number
WO 2010/052700 A3

(51) International Patent Classification:
B32B 18/00 (2006.01)

(21) International Application Number:
PCT/IL2009/000987

(22) International Filing Date:
20 October 2009 (20.10.2009)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
195090 4 November 2008 (04.11.2008) IL

(72) Inventor; and

(71) Applicant : SIMOVICH, Gigi [IL/IL]; 6 Smadar St.,
Savion 56546 (IL).

(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, CL, 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, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

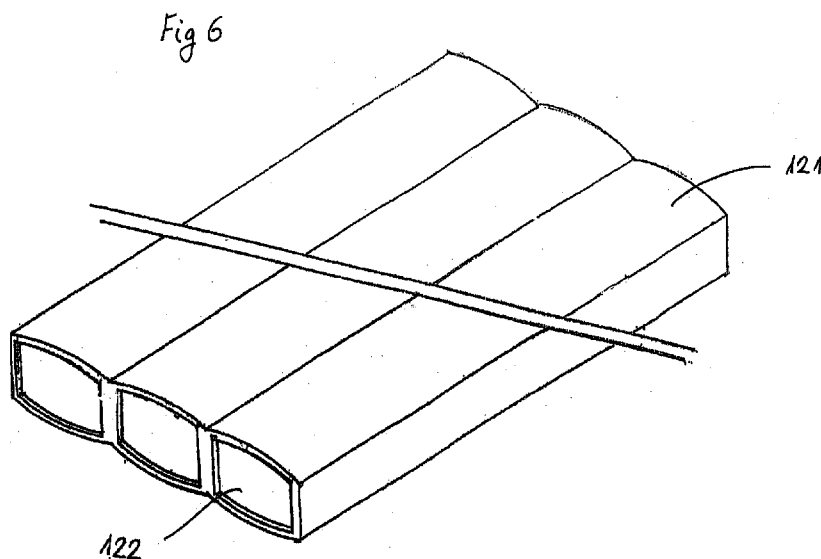
(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS,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

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) Date of publication of the international search report:
15 July 2010

(54) Title: A METHOD AND A DEVICE FOR PRE-STRESSED ARMOR



(57) Abstract: Composite materials in various shapes and sizes and in various configurations for use in ballistic armor confined in cylindrical and dome shaped enclosures; held under pressure to increase the impact absorption factor. An armor comprising an auxiliary layer disposed in front thereof at a determined distance wherein said layer comprises pre-stressed members arranged in a spacious pattern. A method is proposed for manufacturing of pre-stressed structure and armor by expanding the cavity into which ceramic materials are inserted so that pressure is applied to the ceramic materials.

WO 2010/052700 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL 09/00987

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - B32B 18/00 (2010.01)

USPC - 428/325

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): B32B 18/00 (2010.01)

USPC: 428/325

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

IPC(8): B32B 18/00 (2010.01) (text search)

USPC: 428/323, 325, 328,911; 89/901, 906-908, 910, 918; 109/49.5 (text search)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PubWEST; PGPB, USPT, EPAB, JPAB: Google; Google Patents; Search terms: ceramic honeycomb armour ballistic pressure heat mold armor Kevlar spall matrix binder autoclave cylinder hexagon alumina pellet, etc.

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 2004/0020353 A1 (Ravid et al.) 05 February 2004 (05.02.2004) para. [0006] through [0059], Fig. 1-4H	6 and 7 ----- 1-3
X — Y	US 6,892,623 B2 (Benyami et al.) 17 May 2005 (17.05.2005) col. 1 ln. 6 to col. 3 ln. 44, Fig. 1-6	9 and 10 ----- 11 and 14-16
X — Y	US 2007/0034074 A1 (Ravid et al.) 15 February 2007 (15.02.2007) para. [0007] through [0050], Fig. 1-2D	18 and 19 ----- 1-3 and 14-16
Y	US 6,860,186 B2 (Cohen) 01 March 2005 (01.03.2005) col. 8 ln. 22 to col. 10 ln. 42, Fig. 1-11	11
A,P	US 2009/0241764 A1 (Cohen) 01 October 2009 (01.10.2009) entire document	1-3, 6, 7, 9-11, 14-16, 18 and 19

☐ Further documents are listed in the continuation of Box C.

* 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

09 April 2010 (09.04.2010)

Date of mailing of the international search report

28 APR 2010

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450

Facsimile No. 571-273-3201

Authorized officer:

Lee W. Young

PCT Helpdesk: 571-272-4300

PCT OSP: 571-272-7774

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL 09/00987

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.: 4, 5, 8, 12, 13, 17, 22, 24
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 extra sheets at the back of this form —

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 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.: 1-3, 6, 7, 9-11, 14-16, 18, and 19

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.

--- Continued from Box No. III, Observations where unity of invention is lacking:

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I: claims 1-3, 6, 7, 9-11, 14-16, 18 and 19 : directed to ballistic armor and a method of producing ballistic armor including ceramic elements under pressure within enclosures under tension.

Group II: claims 20-21: directed to a method of producing ballistic armor including providing a steel enclosure, and sealing said enclosure, and filling and pressurizing said enclosure with cement and optional aggregate, and allowing the cement to set under pressure, and whereby obtaining an enclosed pre-stressed structure.

Group III: claim 23: directed to a method of producing ceramic pellets including placing a ceramic pellet on a lubricated metal sheet tray or pre-drawn shape, and drawing the said pellet and sheet through a die to produce a stressed structure.

The inventions listed as Groups I - III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

Groups I and II do not include the inventive concept of a method of producing ceramic pellets including placing a ceramic pellet on a lubricated metal sheet tray or pre-drawn shape, and drawing the said pellet and sheet through a die to produce a stressed structure, as required by Group III.

Groups I and III do not include the inventive concept of a method of producing ballistic armor including providing a steel enclosure, and sealing said enclosure, and filling and pressurizing said enclosure with cement and optional aggregate, and allowing the cement to set under pressure, and whereby obtaining an enclosed pre-stressed structure, as required by Group II.

Groups II and III do not include the inventive concept of ballistic armor and a method of producing ballistic armor including ceramic elements under pressure within enclosures under tension., as required by Group I.

Groups I-III therefore lack unity under PCT Rule 13 because they do not share a same or corresponding special technical feature.