



(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

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(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).

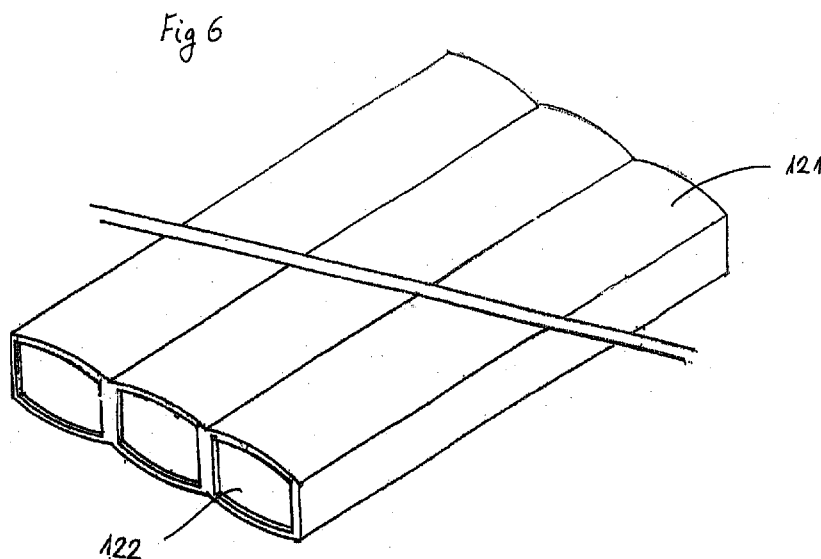
Published:

- with international search report (Art. 21(3))
- with amended claims and statement (Art. 19(1))

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

Date of publication of the amended claims and statement: 2
September 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.

AMENDED CLAIMS

received by the International Bureau on 28 June 2010 (28.06.2010)

1. A ballistic armor comprising: a) a plurality of attached elongated pre-stressed members, and b) wherein members are prism-like shaped having a long axis and a cross-section perpendicular thereto, and c) wherein members long axes are oriented in a radial direction, substantially parallel to a strike face of the armor, and d) wherein each member comprises an elongated enclosure made of high tensile strength and low creep material, and e) wherein at least one prism-like shaped ceramic element is disposed in each enclosure cavity, and f) wherein enclosures are under tension and ceramic elements are under pressure.
2. The Ballistic armor of claim 1 wherein the elongated pre-stressed members are arranged in two overlapping parallel layers.
3. The Ballistic armor of claims 1 or 2 wherein ceramic elements within each enclosure exert pressure one onto its neighbor.
4. A composite armor that comprises a hollow board made of high tensile strength and low creep material, and a) wherein board comprises multiple elongated cavities of uniform cross section, and b) wherein cavities have long axes that are substantially parallel to the board external surface, and c) wherein at least one ceramic element is disposed within each cavity, and wherein ceramic element is subjected to pressure and board is under tension.
5. The armor of claim 4 wherein cavities comprises single curved or cylindrical external surfaces and flat inter-cavity surfaces.
6. A ballistic armor according to claims 4 or 5 wherein the ceramic elements are hollow.
7. A ballistic armor according to any of the preceding claims wherein the said encapsulation material is selected from the group comprising Carbon fiber, Boron fiber, ceramic fiber, steel, Titanium alloy, Aluminum alloy.
8. A ballistic armor according to any of the preceding claims wherein an aspect ratio of said ceramic element is in the range of 0.3 to 2.
9. A ballistic armor according to any of the preceding layers comprising an auxiliary layer disposed in front thereof at a determined distance wherein a ballistic armor layer comprises at least one tensioned pre-stressed enclosure member comprises of a combination or one of Aluminum, Titanium, carbon fibers and steel, and whereby a plurality of enclosure cavities are arranged in a pattern in said layer.

10. An armor according to claim 9 wherein at least one ceramic element is disposed in each said enclosure cavity, and wherein said element is subjected to pressure.
11. An armor according to claim 9 wherein said enclosure is pressurized with at least one of, fluid, low shear strength material, aluminum alloy, magnesium alloy, and concrete.
12. The armor of any of claims 9 to 11 wherein enclosures are hollow rods arranged in a grating pattern.
13. A method of producing a pre-stressed ceramic armor member comprising the following steps, namely, a) pressurizing an encapsulation material cavity with a fluid, and b) inserting ceramic elements into said encapsulation material cavity while under pressure, and c) releasing the said pressure thus removing the fluid, d) whereby the said encapsulation material contracts and exerts pressure on the said ceramic elements.
14. An armor comprising a pre-stressed member produced according to the methods of claims 13.

STATEMENT UNDER ARTICLE 19 (1)

The advantage of pre-stressing reinforcement means is well established. The present invention as presently claimed is directed to elongated reinforcement elements or enclosures that are stretched and filled with ceramic elements and then the tensile force is maintained.

The pre-stressed elongated elements are deployed radially, i.e. substantially in parallel to the strike surface.

This unique construction results in the ceramic reinforcement being put into compression which inhibits crack propagation. The enclosures are in tension. Without wishing to limit ourselves to any particular theory, it is anticipated that on high energy impact, the pre-stressed structure will be more resilient, and preventing transmission of the impacting force through the ballistic armor to the wearer or components protected thereby.

Out of consideration for Unity of the Invention, only one method is claimed, with other method claims withdrawn. The method consists of applying a pressure to the containers in a sealed chamber, e.g. a hydrostatic pressure, and, without releasing the pressure, ceramic elements are introduced into the containers and then the pressure is released to put the ceramic into compression.

All independent claims relate to this unique structure and/or manufacturing technique which is not shown in any of the cited art. Consequently all claims are patentable.