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[Continued on next page]

(54) Title: FIBER REINFORCED CONCRETE

FIG. 1

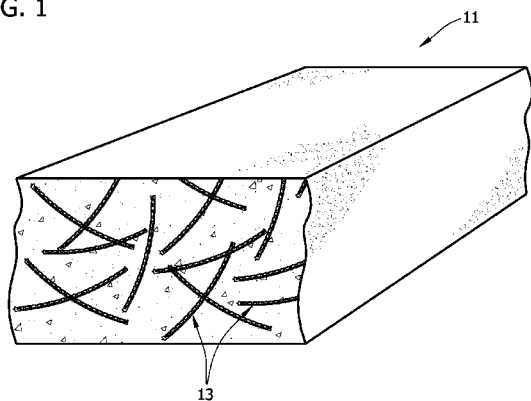
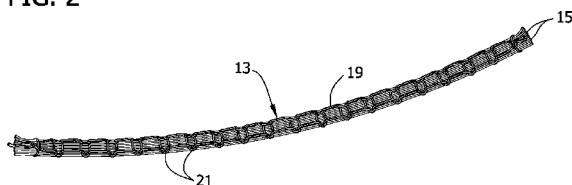


FIG. 2



(57) Abstract: A concrete reinforcing fiber assembly includes a plurality of first fibers and at least one co-fiber attached to at least some of the first fibers. The reinforcing fiber assembly has a water absorption capability of greater than 1.





— *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))*

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INTERNATIONAL SEARCH REPORT

International application No PCT/US2012/042725

A. CLASSIFICATION OF SUBJECT MATTER INV. C04B20/00 C04B28/02 E04C5/07 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) C04B E04C		
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 97/26395 A1 (HANDELMAN JOSEPH H [US]; HOURAHANE DONALD HENRY [ZA]) 24 July 1997 (1997-07-24) abstract page 7, line 9 - page 9, line 13 page 10, line 23 - page 11, line 2 page 14, line 20 - line 25 page 22, line 22 - line 25 pages 1,2	1,2, 10-12, 14,15
X	----- US 4 133 928 A (RILEY VICTOR ET AL) 9 January 1979 (1979-01-09) abstract column 1, line 63 - column 2, line 59 claims 1,2,4,5 ----- -/--	1,2, 10-12
<input checked="" 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 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	
26 September 2012	03/01/2013	
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 Kolb, Ulrike	

INTERNATIONAL SEARCH REPORT

International application No PCT/US2012/042725

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>US 4 620 401 A (L ESPERANCE CHANTAL [CA] ET AL) 4 November 1986 (1986-11-04) abstract column 3, line 47 - column 4, line 22 claims 1,2,7,11,12</p> <p align="center">-----</p>	1,2,11,12
X	<p>EP 2 123 701 A1 (NIPPON STEEL COMPOSITE CO LTD [JP]) 25 November 2009 (2009-11-25) abstract paragraphs [0017], [0024], [0044], [0157] - [0160] figure 5 claims 1,3,4,7,10,12</p> <p align="center">-----</p>	1,11-13,16
X	<p>WO 02/06607 A1 (ATLANTIC FIBER TECHNOLOGIES LT [CA]; GRACE W R & CO [US]; BURKE SEAN []) 24 January 2002 (2002-01-24) abstract page 7, line 17 - page 9, line 14 page 11, line 9 - line 22 page 12, line 26 - page 13, line 11 page 15, line 11 - line 23 figures 1,2 claims 1,9,14-20,23,31</p> <p align="center">-----</p>	1
X	<p>US 6 503 625 B1 (RIEDER KLAUS-ALEXANDER [US] ET AL) 7 January 2003 (2003-01-07) abstract claims 1,5,10,11,14-16,19,20</p> <p align="center">-----</p>	1,9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/042725

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.: 3-8, 21
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:
see FURTHER INFORMATION sheet PCT/ISA/210

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, 2, 9-16

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, 2, 9-16

A concrete reinforcing fiber assembly comprising a plurality of first fibers; and at least one co-fiber attached to at least some of the first fibers, wherein the reinforcing fiber assembly has a water absorption capability of greater than 1; the first fibers and at least one co-fiber are fixed to one another.

2. claims: 1, 3

co-fiber is disposed around the first fiber by means of an overlock stitch

3. claims: 1, 4

co-fiber extends around the first fiber

4. claims: 1, 5

co-fiber forms a non-uniform surface around the first fiber

5. claims: 1, 6

fiber assembly has a helical or shrew shaped configuration

6. claims: 1, 7, 8

co-fiber includes a resilient spine

7. claims: 17-21

A concrete composition comprising a reinforcing fiber assembly comprising a bundle of first fibers; and at least one co-fiber disposed around the fibers, wherein the reinforcing fiber assembly has a water absorption capability of greater than 1; the at least one co-fiber is weaved onto the carbon fiber tow.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 3-8, 21

Present claims 1 and 17 relate to a fiber assembly which has a given desired property, namely water absorption capability. However, the description does not provide support and disclosure in the sense of Article 6 and 5 PCT for any such fiber assembly having the said property and there is no common general knowledge of this kind available to the person skilled in the art. This non-compliance with the substantive provisions is to such an extent, that the search was performed taking into consideration the non-compliance in determining the extent of the search of the claims (PCT Guidelines 9.19 and 9.20). The search of claims 1 and 17 was consequently restricted to the specifically disclosed fiber assembly having the desired property (see description, par. 25 - 28 and embodiments A, B1, B2, B3); there, the plurality of first fibers are specified as made of carbon.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.2), should the problems which led to the Article 17(2) declaration be overcome.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2012/042725

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