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(71) Applicant: ROCKWOOL INTERNATIONAL A/S

[DK/DK]; Hovedgaden 584, 2640 Hedehusene (DK).

(72) Inventor: HJELMGAARD, Thomas; Kovangen 119B,

3480 Fredensborg (DK).

(74) Agent: LETZELTER, DR., Felix; MEISSNER

BOLTE PATENTANWÄLTE RECHTSANWÄLTE
PARTNERSCHAFT MBB, P.O. Box 860624, 81633 Mu-
nich (DE).

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(54) Title: BINDER COMPOSITION FOR MINERAL FIBERS COMPRISING AT LEAST ONE HYDROCOLLOID

(57) Abstract: The invention relates to an aqueous binder composition for mineral fibers comprising at least one hydrocolloid.



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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

INV. C03C25/10 C03C25/26 C09J101/10 C09J105/00 C09J189/06
D04H1/64 E04B1/74

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)

C03C C09J D04H

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, COMPENDEX, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 411 972 A (SALYER IVAL O ET AL) 19 November 1968 (1968-11-19)	1-4, 8-11,14, 15
A	examples 9-18 -----	16-97
X	SARTUQUI JAVIER ET AL: "Biomimetic fiber mesh scaffolds based on gelatin and hydroxyapatite nano-rods: Designing intrinsic skills to attain bone reparation abilities", COLLOIDS AND SURFACES. B, BIOINTERFACES, ELSEVIER, AMSTERDAM, NL, vol. 145, 9 May 2016 (2016-05-09), pages 382-391, XP029640053, ISSN: 0927-7765, DOI: 10.1016/J.COLSURFB.2016.05.019 paragraph [02.2] ----- -/-	1-4, 8-12,14, 15



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

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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

Pollio, Marco

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International application No

PCT/EP2017/061419

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 2 738 232 A1 (OMURA CONSULTING GMBH [CH]) 4 June 2014 (2014-06-04) paragraph [0085] -----	1-4, 6-12,14, 15
X	EMMETT P. BRODERICK,DAMIEN M. O'HALLORAN,YURY A. ROCHEV,MARTIN GRIFFIN,RUSSELL J. COLLIGHAN,ABHAY S. PANDIT: "Enzymatic stabilization of gelatin-based scaffolds", JOURNAL OF MEDICAL MATERIALS RESEARCH, vol. Volume 72B, no. 1, 15 October 2004 (2004-10-15), pages 37-42, XP009194898, DOI: 10.1002/jbm.b.30119 column 3, line 10 - line 21 -----	1-4, 8-11, 13-15
X	EP 1 184 033 A1 (WARNER LAMBERT CO [US]) 6 March 2002 (2002-03-06) claims 1, 2; example 2 -----	1-11,14, 15
X	IRINA G PLASHCHINA ET AL: "Phase behavior of gelatin in the presence of pectin in water-acid medium", POLYMER BULLETIN, SPRINGER, BERLIN, DE, vol. 58, no. 3, 13 October 2006 (2006-10-13), pages 587-596, XP019473107, ISSN: 1436-2449 page 589, line 1 - line 4 -----	1-11,14, 15
X	BAE H J ET AL: "Effects of transglutaminase-induced cross-linking on properties of fish gelatin-nanoclay composite film", FOOD CHEMISTRY, ELSEVIER LTD, NL, vol. 114, no. 1, 1 May 2009 (2009-05-01), pages 180-189, XP025874455, ISSN: 0308-8146, DOI: 10.1016/J.FOODCHEM.2008.09.057 [retrieved on 2008-09-26] page 183, column 2, line 11 - line 19 -----	1-5,7, 10,11, 13-15
X	ZITKO V ET AL: "REAKCIA PEKTÍNU SO ZELATÍNOU ZLOZENIE KOMPLEXOV PEKTÍNU A GELATÍNY", CHEMICKE ZVESTI, BRATISLAVA, vol. XVI, no. 6, 30 October 1961 (1961-10-30), pages 474-481, XP002774635, the whole document ----- -/--	1-5,7, 10-12, 14,15

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2017/061419

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 41 30 077 A1 (ZENTRALINSTITUT FUER ORGANISCH [DE]) 11 March 1993 (1993-03-11) column 1, line 3; example 2 -----	1-4, 9-11, 14-18, 20-23, 29-31, 34-36, 38-41, 47-49, 52-54, 56-62, 68-70, 73-75, 77,78
X	WO 2010/125163 A1 (DYNEA OY [FI]; W G VAN HERWIJNEN HENDRIKUS [AT]; JOBBER ANDREW [AT]; P) 4 November 2010 (2010-11-04) paragraph [0028] - paragraph [0029]; example 3 -----	1-4, 9-11, 14-18, 20-23, 29-31, 34-36, 38-41, 47-49, 52-54, 56-62, 68-70, 73-75, 77,78
X	WO 2010/132641 A1 (OWENS CORNING INTELLECTUAL CAP [US]; CHEN LIANG [US]; DOWNEY WILLIAM E) 18 November 2010 (2010-11-18) claim 1; examples -----	1-4,16, 17, 20-23, 26,27, 38-41, 57-62, 77,78
X	US 2011/200814 A1 (HERNANDEZ-TORRES JESUS M [US] ET AL) 18 August 2011 (2011-08-18) claims; examples ----- -/--	1-4,16, 17, 20-23, 26,27, 38-41, 57-62, 77,78

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2017/061419

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2011/002730 A1 (OWENS CORNING INTELLECTUAL CAP [US]; HAWKINS CHRISTOPHER [US]; CHEN LI) 6 January 2011 (2011-01-06) claims; examples -----	1-4, 16, 17, 20-23, 26, 27, 38-41, 57-62, 77, 78

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.: 1-4, 6-15(all partially)
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.:

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: 1-4, 6-15(all partially)

Aqueous binder composition suitable for mineral fibers comprising gelatin as a polyelectrolyte hydrocolloid.

2. claims: 1-15(partially)

Aqueous binder composition suitable for mineral fibers comprising gelatin as a polyelectrolyte hydrocolloid and a pectin as polyelectrolyte hydrocolloid.

3. claims: 1-15(partially)

Aqueous binder composition suitable for mineral fibers comprising gelatin as a polyelectrolyte hydrocolloid and a further polyelectrolyte hydrocolloid selected from the group of starch, alginate, agar agar, carrageenan, gellan gum, guar gum, gum arabic, locust bean gum, xanthan gum, cellulose derivatives.

4. claims: 16-97(partially)

Mineral wool product comprising a (polyelectrolyte) hydrocolloid binder other than gelatin, method of producing a mineral wool product using (polyelectrolyte) hydrocolloid binders other than gelatin, use of a (polyelectrolyte) hydrocolloid binder other than gelatin for binding mineral wool, method of bonding surfaces of two or more elements, wherein one element is a mineral wool element and the adhesive comprises a (polyelectrolyte) hydrocolloid other than gelatin.

5. claims: 16-97(partially)

Mineral wool product comprising a (polyelectrolyte) hydrocolloid binder other than gelatin, method of producing a mineral wool product using (polyelectrolyte) hydrocolloid binders other than gelatin, use of a (polyelectrolyte) hydrocolloid binder other than gelatin for binding mineral wool, method of bonding surfaces of two or more elements, wherein one element is a mineral wool element and the adhesive comprises a (polyelectrolyte) hydrocolloid other than gelatin.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 1-4, 6-15(all partially)

Claims 1-15

1) Present claim 1 is characterised by the fact that the binder comprises at least one hydrocolloid. The man skilled in the art associates the word hydrocolloid with an extremely large number of possible compounds. Furthermore, there is no universal definition of the word hydrocolloid. Some authors define the word hydrocolloid as indicating any material that forms a colloid (dispersion/emulsion) when mixed with water. Some other define a hydrocolloid as being a substance that yields a gel when mixed with water.

Support and disclosure in the sense of Article 6 and 5 PCT is to be found for only a very small proportion of all possible compounds falling within the scope of the expression hydrocolloid (see page 7, lines 7-9). Even though a synthetic origin is not excluded in this passage, the description does not give any concrete hint to use as hydrocolloid in the frame of the invention a polymer of synthetic origin. In page 7, lines 19,20 it is underlined that an hydrocolloid is of natural origin. The examples only involve the use of hydrocolloids of natural origin. It is also noticed that the binder described as a comparative binder on page 54 of the description, falls within the scope of a broad interpretation of the word hydrocolloid as well.

2) The set of claims has to be able to solve the subjective (and objective) technical problem. According to the prior art known to the applicant the problem to be solved is to avoid curing at high temperature and exposure to harmful substances as well as providing binders made of renewable (natural) ingredients (see page 4, lines 1-8). A composition comprising 1 ppm of gelatin and the rest being phenol formaldehyde is within the scope of present claim 1, but it is not able to solve the technical problems described by the applicant.

In view of all these reasons, the 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 claims 1-13 (PCT Guidelines 9.19 and 9.23).

Claim 2 provides a direct and unambiguous disclosure of materials which work as hydrocolloids in the frame of the present application. A generalisation to hydrocolloids of specific classes of compounds, such as proteins or polysaccharides is not sufficient to delimit claim 1 to a clear scope. The man skilled in the art would be left with an undue burden to determine, which hydrocolloids among all possible polysaccharides or proteins are suitable within the frame of the present application.

3) In addition the initial phase of the search revealed a very large number of documents relevant to the issue of novelty. Claim 1 is simply directed to a binder "suitable" for binding mineral fibers. A feature of use is not a feature of the product. Compositions comprising or consisting of gelatin and or polysaccharide are very well known binders. Therefore the search was performed taking

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

into consideration also this issue in determining its extent. In view of the examples, the search has been limited to compositions where the binder comprises gelatin as a hydrocolloid or mixtures of gelatin and a polysaccharide (as described in claim 5) as hydrocolloids.

In view of all these observations the search had to be restricted to the broadest disclosure of hydrocolloids, which are expected to work in the frame of the application and which are disclosed in the application. This group of hydrocolloids is described in claim 2. Furthermore, it had to be limited by a set of clearly disclosed binders, which can be searched without being confronted with a "novelty overflow". This limitation is reflected by the subject matter of claim 5. Additionally, the search had to be limited by those features which are essential to the solution of the technical problem to be solved, which are reflected in claim 15. Therefore, the search of claims 1-15 was restricted to binders consisting essentially of gelatin as hydrocolloid (claim 2) or a mixture of gelatin as hydrocolloid and a further electrolyte hydrocolloid being a polysaccharide (claim 5), water and the optional components described in claim 15.

Claims 16-97

Concerning claims 16-97 it is self evident that the issues of paragraphs 1 and 2 above applies also to these claims, so that an incomplete additional search has been performed for these claims as well. Additionally, the attention of the applicant is drawn to documents D9 - D13 (see for reference in section V below) which are examples of the fact, that it was commonly known in the art to bind mineral wool with aqueous hydrocolloids, at the time this application was filed.

Therefore, the search of claims 16-97 has been restricted to mineral wool products, methods of producing mineral wool products, use of (polyelectrolytic) hydrocolloids as binder for mineral wool product, method of bonding surfaces of mineral wool elements and bound surfaces in which a composition consisting essentially of water, gelatin and a further component selected from the group consisting of pectin, alginate, carrageenan, gum arabic, xanthan gum, cellulose is comprised or involved.

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 Guidelines C-IV, 7.2), 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/EP2017/061419

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3411972	A	19-11-1968	NONE
EP 2738232	A1	04-06-2014	CA 2833016 A1 29-05-2014 DK 2738232 T3 17-08-2015 EP 2738232 A1 04-06-2014 JP 2014105331 A 09-06-2014 SI 2738232 T1 30-09-2015 US 2014148532 A1 29-05-2014
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