

PATENT COOPERATION TREATY

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PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference see form PCT/ISA/220		FOR FURTHER ACTION See paragraph 2 below
International application No. PCT/US2015/011154	International filing date (day/month/year) 13.01.2015	Priority date (day/month/year) 15.01.2014
International Patent Classification (IPC) or both national classification and IPC INV. B28C7/04 B01F5/04 B01F15/04 B28B19/00 B28C5/06		
Applicant UNITED STATES GYPSUM COMPANY		

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA:  European Patent Office P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Fax: +31 70 340 - 3016	Date of completion of this opinion see form PCT/ISA/210	Authorized Officer Telephone No. +31 70 340-0	
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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed.
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
 - a. ☐ forming part of the international application as filed:
 - ☐ in the form of an Annex C/ST.25 text file.
 - ☐ on paper or in the form of an image file.
 - b. ☐ furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. ☐ furnished subsequent to the international filing date for the purposes of international search only:
 - ☐ in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).
 - ☐ on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>3-15</u>
	No: Claims	<u>1, 2</u>
Inventive step (IS)	Yes: Claims	<u>5-7</u>
	No: Claims	<u>1-4, 8-15</u>
Industrial applicability (IA)	Yes: Claims	<u>1-15</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Re Item V

1 Cited documents

Reference is made to the following documents:

- D1 US 2006/244183 A1 (WITTBOLD JAMES R [US] ET AL) 2 November 2006 (2006-11-02)
- D2 US 5 683 635 A (SUCECH STEVEN W [US] ET AL) 4 November 1997 (1997-11-04) cited in the application
- D3 US 5 105 843 A (CONDRON JAMES A [US] ET AL) 21 April 1992 (1992-04-21)

2 Independent claim 1

2.1 The present application does not meet the criteria of Article 33(2) PCT, because the subject matter of claim 1 is not novel.

2.2 D3 (column 32, lines 1-7; column 41, lines 11-31; figure 6) discloses:

A foam injection system (400) for a cementitious slurry mixing and dispensing assembly (see interpretation in §2.3 below), the foam injection system (400) comprising:

a foam injection body (401,402,408), the foam injection body (401,402,408) defining a slurry passageway and a port passageway, the port passageway having a port opening (see figure 6) in fluid communication with the slurry passageway;

a first port insert (411), the first port insert (411) defining a first foam passageway having a first orifice with a first orifice size, the first port insert (411) adapted to removably mount to the foam injection body (401,402,408) such that the first foam passageway is in fluid communication with the slurry passageway via the port opening of the port passageway; and

a second port insert (412), the second port insert (412) defining a second foam passageway having a second orifice with a second orifice size, the second port insert (412) adapted to removably mount to the foam injection body (401,402,408) such that the second foam passageway is in fluid communication with the slurry passageway via the port opening of the port passageway, and the second orifice size being different than the first orifice size (see Table 5 in column 41, lines 11-31).

- 2.3 The expression "*A foam injection system (400) for a cementitious slurry mixing and dispensing assembly*" is to be read as "*An injection system suitable for injecting foam for a cementitious slurry mixing and dispensing apparatus*" in the light of the PCT Guidelines 5.23. Since D3 does not restrict itself only to the preparation of a coating composition and explicitly discloses that the apparatus can be used in the field of effectively mixing a proportionated plurality of fluids (see column 1, lines 16-18), the injection system of D3 is considered as being suitable for the introduction of foam in a cementitious slurry.
- 2.4 The subject matter of claim 1 is therefore lacking novelty.
- 2.5 In addition the subject matter of claim 1 is also considered as lacking inventive step when D1 is used as closest prior art contrary to the requirements of Art. 33(3) PCT.
- 2.6 D1 (figures 5,6; paragraphs [0027], [0041]) (the references in parentheses applying to this document) is considered to be the closest prior art to the subject matter of independent claim 1 and discloses
- A foam injection system for a cementitious slurry mixing and dispensing assembly (430), the foam injection system comprising:
- a foam injection body (45), the foam injection body (45) defining a slurry passageway and a port passageway (48), the port passageway (48) having a port opening in fluid communication with the slurry passageway;
- a first port insert (33), the first port insert (33) defining a first foam passageway having a first orifice (provided in the pipe (33)) with a first orifice size, the first port insert (33) adapted to removably mount to the foam injection body (45) such that the first foam passageway is in fluid communication with the slurry passageway via the port opening of the port passageway (48).
- 2.7 It is to be noted that, although D1 does not make reference to a "port insert", its disclosure is considered implicit in order to connect line (33) to ring (45).
- 2.8 The subject-matter of independent claim 1 differs therefore from this known system of D1 in that a second port insert (200, 500) is provided, the second port insert (200, 500) defining a second foam passageway (215, 515) having a second orifice (240, 540) with a second orifice size (0_3 , 0_4 , 0_5), the second port insert (200, 500) adapted to removably mount to the foam injection body (305, 605) such that the second foam passageway (215, 515) is in fluid communication with the slurry passageway (310, 610) via the port opening (317, 617) of the port passageway (315, 615), and the second orifice size (0_3 , 0_4 , 0_5) being different than the first orifice size (0_1 , 0_4).

- 2.9 The problem to be solved by the present invention may be therefore regarded as providing a foam injection system wherein the flow condition of the flow of aqueous foam can be varied, such as, to vary the foam injection pressure to achieve a desired flow condition (see the description [0039]).
- 2.10 Although D1 does not disclose explicitly that the port insert (33) may be changed to vary the flow condition of the foam injected into the slurry passageway, the skilled man would find it obvious to adapt the internal diameter of the pipe (33) in accordance with the required flow rate of the foam to be injected. If the process requires a substantial change in the flow rate by injecting for instance a foam with a different density, it is considered as a normal practice for the skilled man to adapt the diameter of the insert/pipe (33) to the new flow conditions so as to guaranty a stable and reliable process. He would therefore make use of a second insert/pipe more adapted to the new process parameters.
- 2.11 Thus, the subject matter of claim 1 is considered obvious and lacks therefore inventive step.
- 2.12 The same reasoning applies also for D2, wherein in D2 it would be obvious for the skilled man to adapt the diameter of the pipes 32 and 34/36 to the flow condition of the foams having different densities. Moreover the modification of D2 so that the port inserts (32,34,36) are removably mounted to the slurry passageway is considered trivial.

3 Independent claim 13

- 3.1 The present application does not meet the criteria of Article 33(3) PCT, because the subject-matter of claim 13 is not inventive.
- 3.2 D1 (figures 5,6; paragraphs [0027], [0041]) is considered to be the closest prior art to the subject matter of independent claim 13 and discloses:
- A method of preparing a cementitious product comprising:
discharging a flow of aqueous cementitious slurry from a mixer (450);
passing the main flow of aqueous cementitious slurry through a slurry passage (425,438) of a foam injection body (45) of a foam injection system;
conveying a flow of aqueous foam to a first foam passageway of a first port insert (33) removably mounted to the foam injection body (45), the first port insert (33) removably mounted to the foam injection body (45) such that the first foam passageway is in fluid communication with the slurry passageway (425,438) via the port opening (48) of the port passageway; and

injecting the flow of aqueous foam in the first foam passageway of the first port insert (33) under a first flow condition into the flow of aqueous cementitious slurry passing through the slurry passageway (425,438) to form a flow of foamed cementitious slurry.

- 3.3 The subject-matter of independent claim 13 differs therefore from this known method of D1 in that the foam injection system is defined according to any one of claims 1 to 9.
- 3.4 Since it has been demonstrated in §2.5-2.11 above that claim 1 is lacking inventive step starting from D1, the subject matter of claim 13 oriented to the method of using the injection system of claim 1 is also considered as lacking inventive step.
- 3.5 The same reasoning applies also with D2 as closest prior art, wherein the fact that the port inserts are removably mounted to the slurry passageway is considered obvious.

4 Dependent claims

- 4.1 Dependent claims 2-4,8-12,14 and 15 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step.
- 4.1.1 D3 (column 32, lines 1-7; column 41, lines 11-31; figure 6) discloses the subject matter of claim 2.
- 4.1.2 D1 (figures 5,6; paragraphs [0027], [0041]) discloses the subject matter of claims 3,9-12,14.
- 4.1.3 The use of a port insert body as defined in claim 4 and of a port insert as defined in claim 8 are considered as obvious developments starting from D1 in order to connect the transfer line (33) to the ring (45).
- 4.1.4 As already discussed in §2.10 of the present opinion, the use of a second port insert as in claim 15 is considered obvious starting from D1 in order to adapt the process to new flow conditions.
- 4.2 Dependent claims 5-7 in combination with claims 1 and 4 seem to involve an inventive step in the sense of Art. 33(3) PCT.

5 **Industrial applicability**

- 5.1 The subject matter of claims 1-15 is considered as being industrially applicable (Article 33(4) PCT).

Re Item VII

- 1 Claim 1 defines that the second orifice size is different than the first orifice size while referring to the reference sign $\varnothing_4$ for both of them. A lack of clarity could therefore occur when the reference signs are used to support the claims.