

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference SP15-369	FOR FURTHER ACTION		See item 4 below
International application No. PCT/US2016/063936	International filing date (<i>day/month/year</i>) 29 November 2016 (29.11.2016)	Priority date (<i>day/month/year</i>) 30 November 2015 (30.11.2015)	
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237			
Applicant CORNING INCORPORATED			

<p>1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).</p> <p>2. This REPORT consists of a total of 9 sheets, including this cover sheet.</p> <p>In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.</p>																								
<p>3. This report contains indications relating to the following items:</p> <table> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. I</td> <td>Basis of the report</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table> <p>4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).</p>	<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input type="checkbox"/>	Box No. II	Priority	<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/>	Box No. VI	Certain documents cited	<input type="checkbox"/>	Box No. VII	Certain defects in the international application	<input checked="" type="checkbox"/>	Box No. VIII	Certain observations on the international application
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	Date of issuance of this report 05 June 2018 (05.06.2018)
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PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

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

To:

see form PCT/ISA/220

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/US2016/063936

International filing date (day/month/year)
29.11.2016

Priority date (day/month/year)
30.11.2015

International Patent Classification (IPC) or both national classification and IPC
INV. C03C23/00 C03C17/36 C03C27/06 E06B3/66 E06B3/663 B29C65/16 C03C27/10

Applicant
CORNING INCORPORATED

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 43*bis*.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 66.1*bis*(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:



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Date of completion of
this opinion

see form
PCT/ISA/210

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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>11-22</u>
	No: Claims	<u>1-10</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-22</u>
Industrial applicability (IA)	Yes: Claims	<u>1-22</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1 Relevant state of the art

Reference is made to the following documents:

D1 US 2014/186557 A1 (GRZYBOWSKI RICHARD ROBERT [US] ET AL) 3 July 2014 (2014-07-03)

D2 WO 2013/008724 A1 (ASAHI GLASS CO LTD [JP]; TAKEDA SATOSHI [JP]; MURAKAMI RYOTA [JP]; MIT) 17 January 2013 (2013-01-17)

2 Novelty and inventive step - Article 33 PCT

2.1 Independent claim 1

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of independent claim 1 is not new in the sense of Article 33(2) PCT.

2.1.1 D1 discloses (abstract, figures 1-4 and 12-15 and in paragraphs 33-42, 45-46 and 97-110) very similar vacuum insulated glass (VIG) windows to the ones described in example 2 of the present application. More specifically, it discloses in the above mentioned passages in general a method of making a VIG comprising the steps

i) irradiating a first glass pane with laser radiation to form a plurality of glass-bumps on a first inner surface of the first glass pane; the first glass pane comprising a first glass material, the first inner surface opposite a first outer surface, and a first outer edge,

ii) coating a low-E coating on the glass pane obtained in i),

iii) arranging the first inner surface of the first glass pane adjacent and substantially parallel to a second inner surface of a second glass pane; and the second glass pane comprising a second glass material, the second inner surface opposite a second outer surface, and a second outer edge,

iv) bonding the first and second glass panes to create a sealed interior region between the first and second inner surfaces of the first and second glass panes by edge sealing with a UV-laser the two glass panes.

Therefore, the obtained VIG shows all the features as defined in independent claim 1.

2.1.2 **D2** discloses (abstract and example 1 (paragraphs 62-70)) a method of making a VIG comprising the steps

i) providing a first glass pane,

ii) providing a frit paste for forming spacers and for forming an edge sealing region on one of the surfaces of the first glass pane,

iii) applying the frit paste to the first glass pane, drying and heating the obtained glass pane thus obtaining a glass pane having an edge region for sealing and spacers of a glass-particle composite material of 15 μm thickness/height,

iv) providing a second glass pane,

v) coating one surface of the second glass pane with a low-E coating stack of the type "ZnO/Ag/ZnO/Ag/ZnO" by a sputtering process,

vi) placing the first and second glass panes in a vacuum chamber such that the modified surface (edge sealing region/spacers) of the first glass pane faces the modified surface (low-E coating) of the second glass pane,

v) applying a vacuum of 0.1 Pa to the vacuum chamber,

vi) irradiating the edge sealing region created on the first glass pane with a CW-laser emitting at 808 nm with a power of 16 thereby sealing the two glass panes of the VIG unit.

Furthermore, it is noted that alternative laser types are disclosed in paragraph 52 amongst which is listed also an UV-excimer laser.

Therefore, the obtained VIG shows all the features as defined in independent claim 1.

2.2 **Independent claim 11**

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of independent claim 11 does not involve an inventive step in the sense of Article 33(3) PCT.

Starting from **D1** as the closest prior art the difference between the subject-matter of independent claim 1 and the VIG disclosed in **D1**, see discussion in section 2.1.1, is that the low-E coating is formed on the second glass pane and not on the first glass pane containing the glass-bumps.

Therefore, the subject-matter of independent claim 1 is novel.

The effect associated with this difference is not known, since the present application contains no experimental data which could serve as proof for the presence of any surprising technical effect.

Therefore, the problem underlying independent claim 11 can only be seen in the provision of alternative VIG architectures to the one of **D1** discussed above.

With this problem in mind the person skilled in the art has only a very limited amount of possible alternative VIG architectures, namely, to change the location of the low-E coating in the VIG. Thus, he has basically only one alternative choice, namely to coat the second glass pane on the surface facing the surface with the spacers on the first glass pane. It is noted that he would certainly not come up with the idea to place the low-E coating on an "outside"-surface of one of the two glass panes of the VIG. Thus, he is in one-way situation and would take into consideration to change the location of the low-E coating without applying inventive skills. Furthermore, it has to be noted that he would certainly also be aware of **D2** which already suggests this alternative VIG architecture.

Therefore, the subject-matter of independent claim 11 does not involve an inventive step in view of **D1** taken alone or in combination with **D2**.

2.3 **Independent claim 20**

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of independent claim 11 does not involve an inventive step in the sense of Article 33(3) PCT.

It is noted that independent claim 20 differs from the method disclosed in **D1**, see section 2.1.1, in that the low-E coating is on the second glass pane and not on the first glass pane comprising the spacers.

Therefore, the same argumentation as outlined for independent claim 11 applies also for independent claim 20 *mutatis mutandis*.

2.4 Dependent claims 2-10, 12-19 and 21-22

Dependent claims 2-10, 12-19 and 21-22 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. The reasons are the following:

- 2.4.1 The additional features of dependent claims 2-10 are ex- or implicitly disclosed in at least **D1**, see the discussion of **D1** in section 2.1.1 and the passages cited in the International search report for the relevant information. Therefore, they are not novel.
- 2.4.2 The additional features of dependent claims 12-19 and 21-22 are already disclosed in the closest prior art document **D1**, see the discussion of **D1** in section 2.1.1 and the passages cited in the International search report for the relevant information. Therefore, they do not involve an inventive step.

Re Item VIII

Certain observations on the international application

1 The application does not meet the requirements of Article 6 PCT, because claims 2-5, 8, 10, 19 are not clear.

1.1 Claims 2-5 and 10

The term "bond" used in claims 2-5 and 10 was not defined in independent claim 1 to which these claims refer. Therefore, this term vague and unclear and leaves the reader in doubt as to the meaning of the technical feature to which it refers, thereby rendering the definition of the subject-matter of said claim unclear, Article 6 PCT.

For the assessment of novelty and inventive step under item V it was assumed that the term "bond" refers to the "edge seal" defined in independent claim 1.

1.2 Claim 2

The term "formed by absorption of at least 30% of laser radiation having a wavelength predetermined by the low emissivity layer" used in claim 2 is vague and unclear and leaves the reader in doubt as to the meaning of the technical feature to which it refers, thereby rendering the definition of the subject-matter of said claim unclear, Article 6 PCT. The structural technical feature can be found in claim 3 defining the predetermined wavelength range.

1.3 Claim 8

Claim 8 does not meet the requirements of Article 6 PCT because the matter for which protection is sought is not clearly defined. The claim attempts to define the subject-matter purely in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result.

1.4 Claim 19

The category of this claim is unclear. Basically this claim is directed to a vacuum insulated glass (VIG) window since it contains a reference to independent claim 11. On the other hand it defines that "the second glass pane is the outside glass pane on a structure", i.e. the location of second pane in relation with a structure. Thus, this definition encompasses, beside the window also the structure, which is another entity than the window itself. Therefore, this definition is vague and unclear and leaves the reader in doubt as to the meaning of the technical feature to which it refers, thereby rendering the definition of the subject-matter of said claim unclear, Article 6 PCT.