

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.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/US2018/048229

International filing date (day/month/year)
28.08.2018

Priority date (day/month/year)
28.08.2017

International Patent Classification (IPC) or both national classification and IPC
INV. F01N3/022 F01N3/28 B28B3/26 B01D46/24 B01J35/04

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 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:



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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>3-11, 14, 15, 18</u>
	No: Claims	<u>1, 2, 12, 13, 16, 17, 19, 20</u>
Inventive step (IS)	Yes: Claims	<u>3-11, 14, 15, 18</u>
	No: Claims	<u>1, 2, 12, 13, 16, 17, 19, 20</u>
Industrial applicability (IA)	Yes: Claims	<u>1-20</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

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

1 Reference is made to the following documents (D1-D4):

1.1 D1: US 2007/0231533 A

1.2 D2: WO 2017/040138 A

1.3 D3: EP 0 463 654 A

1.4 D4: JP 06 023215 A (automatic translation attached)

2 Novelty and Inventive Step

2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1, 2, 12, 13, 16, 17, 19 and 20 is not new in the sense of Article 33(2) PCT.

2.2 The subject-matter of dependent claims 3 to 11, 14, 15 and 18 is considered to be new (Article 33(2) PCT) and to involve an inventive step (Article 33(3) PCT) since it does not seem to be rendered obvious by the available prior art cited in the International Search Report.

2.3 The invention is industrially applicable (Article 33(4) PCT).

2.4 Novelty of Independent Device Claim 1

2.4.1 Document D1 discloses (the references in parentheses applying to said document):

2.4.1.1 A honeycomb body (see figures 3 and 7) comprising a honeycomb structure (40) comprised of:
a plurality of interconnected webs (5) defining a plurality of cell channels (44) in a honeycomb matrix having a central axis (C) orthogonal to its transverse cross section, the plurality of interconnected webs (5) comprising:
radial webs (46) arranged to diverge from one another with respect to the central axis (C) as the radial webs (46) extend toward an outermost periphery (9) of the honeycomb structure (40), the radial webs (46) comprising a first radial web (48a) and a second radial web (48a);
tangential webs (49) arranged concentrically with respect to the central axis (C), wherein at least one of the tangential webs (49) is a tangential transition web (the tangential web arranged radially outward next to web 52) and is located between two adjacent radial webs (no reference sign); and

at least one transition structural component (52) located radially inward from the tangential transition web (the tangential web arranged radially outward next to web 52), wherein the at least one transition structural component (52) comprises a first inclined web ("left part" of the transition structural component (52) at the beginning of each additional radial web) having a first end coupled to the first radial web and a second inclined web ("right part" of the transition structural component (52) at the beginning of each additional radial web) having a first end coupled to the second radial web.

- 2.4.2 **Remark:** The core of the invention seems to be the particular structure of the first and second **inclined webs**. Since the term "inclined web" does not have a well defined meaning in the art of ceramic honeycomb structures, it was construed in its broadest possible way (see also point 6 further below).
- 2.4.3 Thus, the subject-matter of independent device claim 1 is not new in the sense of Article 33(2) PCT.
- 2.4.4 Documents D2 to D4 also disclose all the technical features of independent device claim 1.

2.5 **Novelty of Independent Device Claim 17**

- 2.5.1 (The reasoning under point 2.4 also applies mutatis mutandis to the subject-matter of independent device claim 17)

2.6 **Novelty of Independent Device Claim 20**

- 2.6.1 Document D2 discloses (the references in parentheses applying to said document):
- 2.6.2 An extrusion die (see figures 8b and 8c), comprising:
an outlet face of a die body having a central axis orthogonal to the outlet face and comprising a matrix of intersecting slots comprising:
radial slots arranged to diverge from one another with respect to the central axis as the radial slots extend toward an outermost periphery of the die body, the radial slots comprising a first radial slot and a second radial slot;
tangential slots arranged concentrically with respect to the central axis, wherein at least one of the tangential slots is a tangential transition slot and is located between two adjacent radial slots; and
at least one transition structural component located radially inward from the tangential transition slot, wherein the at least one transition structural

component comprises a first inclined slot having a first end coupled to the first radial slot and a second inclined slot having a first end coupled to the second radial slot.

2.6.3 **Remark:** The core of the invention seems to be the particular structure of the first and second **inclined slots**. Since the term "inclined slot" does not have a well defined meaning in the art of extrusion dies, it was construed in its broadest possible way (see also point 6 further below).

2.6.4 Thus, the subject-matter of independent device claim 20 is not new in the sense of Article 33(2) PCT.

2.7 **Novelty of Dependent Claims 2, 12, 13, 16 and 19**

2.7.1 Document D1 further discloses the additional technical features of dependent claims 2, 12, 13 and 16 (the references in parentheses applying to said document):

2.7.1.1 A honeycomb body (see figures 3 and 7) wherein the at least one transition structural component (40) comprises a radially-extending web (48b) having a first end and a second end, the first end coupled to the tangential transition web (the tangential web arranged radially outward next to web 52) and the second end coupled to a second end of the first inclined web ("left part" of the transition structural component (52) at the beginning of each additional radial web) and a second end of the second inclined web ("right part" of the transition structural component (52) at the beginning of each additional radial web);

wherein at least one of the radial webs (46) extends from the central axis (C) to an outermost periphery (9) of the honeycomb matrix (see figure 3);

the first inclined web ("left part" of the transition structural component (52) at the beginning of each additional radial web) and the second inclined web ("right part" of the transition structural component (52) at the beginning of each additional radial web) are continuous curved web (see figure 3); and

wherein the first inclined web intersects the first radial web ("left part" of the transition structural component (52) at the beginning of each additional radial web) at an angle that is the same as an angle that the second inclined web ("right part" of the transition structural component (52) at the beginning of each additional radial web) intersects the second radial web (see figure 3).

- 2.7.2 Document D3 further discloses the additional technical features of dependent claim 19 (the references in parentheses applying to said document):
- 2.7.2.1 A honeycomb body (see figure 1), wherein the first inclined web has a thickness approximately equal to a thickness of at least one tangential web (the wall thickness is the same all over).
- 2.7.3 Dependent claims 2, 12, 13, 16 and 19 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty

Re Item VII

- 3 Independent claim 1, 17 and 20 are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art D1 or D2 respectively being placed in the preamble (Rule 6.3(b)(i) PCT) and the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).
- 4 The features of claims 1 to 20 are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).
- 5 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in documents D1 to D4 is not mentioned in the description, nor are these documents identified therein.

Re Item VIII

- 6 The term "inclined web" used in the claims, in particular in independent device claims 1 and 17, is vague and unclear and leaves the reader in doubt as to the meaning of the actual geometry to which it refers, thereby rendering the definition of the subject-matter of said claim unclear, Article 6 PCT.
- It is clear from the description on page 15, paragraph [0039], lines 6 to 13 that feature: "the first inclined web is coupled to the first radial web at an inclined angle the inclined angle being less than 90 degrees" is essential to the definition of the invention. Since independent claims 1 and 17 do not contain

this feature they do not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

- 7 Independent claim 17 comprises all the features of independent claim 1 and is therefore not appropriately formulated as a an independent claim. The additional features of claim 17 should rather be formulated as a claim dependent on claim 1 (Rule 6.4 PCT).
- 8 The term "incorporated herein by reference", paragraph [0001], lines 3 and 4, might lead to clarity issues in the regional phase, because the patent specification is not self-contained as far as the essential features of the invention are concerned.