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(54) Title: SYSTEM, PROCESS AND RELATED SINTERED ARTICLE

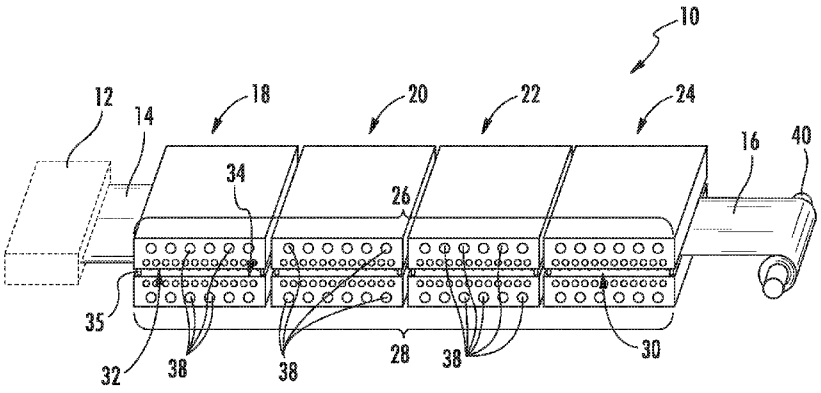


FIG. 1

(57) Abstract: A system, process and related sintered article are provided. The process includes supporting a piece of inorganic material with a pressurized gas and sintering the piece of inorganic material while supported by the pressurized gas by heating the piece of inorganic material to a temperature at or above a sintering temperature of the inorganic material such that the inorganic material is at least partially sintered forming the sintered article. The inorganic material is not in contact with a solid support during sintering. The sintered article, such as a ceramic article, is thin, has high surface quality, and/or has large surface areas.

WO 2017/132216 A3

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2017/014862

A. CLASSIFICATION OF SUBJECT MATTER
INV. C04B35/622 C04B35/64 B65G49/06 C03B35/00 C03B23/035
C03B29/12
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 B65G C03B

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 A	EP 0 243 858 A2 (IBM [US]) 4 November 1987 (1987-11-04) column 10, lines 35-50; figure 5E claims 1,10,12 paragraph [0002] claim 5	1-3,7,8 4-6,9, 10,22

X	US 3 223 549 A (FREDLEY JAMES C ET AL) 14 December 1965 (1965-12-14) figures 5,6 column 2, lines 20-55 column 4, lines 24-46; figure 1 column 4, line 65 - column 6, line 51 column 11, lines 37-42 column 15, lines 50-59 examples I,II,III column 3, lines 6-10	1-10,22

☐ 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

Date of the actual completion of the international search	Date of mailing of the international search report
4 May 2017	02/08/2017

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Sow, Eve

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2017/014862

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.:
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:

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.:

1-10, 22

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: 1-10, 22

A process of forming a sintered article, comprising:
supporting a piece of inorganic material with a pressurized gas; and
sintering the piece of inorganic material while supported by the pressurized gas by heating the piece of inorganic material to a temperature at or above a sintering temperature of the inorganic material such that the inorganic material is at least partially sintered forming the sintered article, wherein at least a portion of the inorganic material being sintered is not in contact with a solid support during sintering.

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2. claims: 11-21

A sintered article comprising:
a first major surface;
a second major surface opposite the first major surface;
an at least partially sintered inorganic material defining the first major surface, the second major surface and a body extending between the first and second major surfaces;
an average thickness between the first and second major surfaces is no more than 1 mm;
a width defined as a first dimension of one of the first or second major surfaces orthogonal to the thickness; and
a length of the sintered article defined as a second dimension of one of the first or second major surfaces orthogonal to both the thickness and the width of the sintered article, wherein the sintered article is thin such that at least one of the width and the length is greater than five times the average thickness;
wherein the first major surface is defined by a first surface quality metric and the second major surface is defined by a second surface quality metric, wherein the first surface quality metric is substantially the same as the second surface quality metric;
wherein the inorganic material is selected from the group consisting of polycrystalline ceramic and synthetic mineral.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2017/014862

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0243858 A2	04-11-1987	DE 3787993 D1	09-12-1993
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US 3223549 A	14-12-1965	NONE	