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6, DK-3480 Fredensborg (DK).
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- as to applicant's entitlement to apply for and be granted a
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- of inventorship (Rule 4.17(iv))

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(54) Title: GASKET FREE GRID MODULES FOR CATALYST SUPPORT AND A MODULAR SYSTEM HEREOF

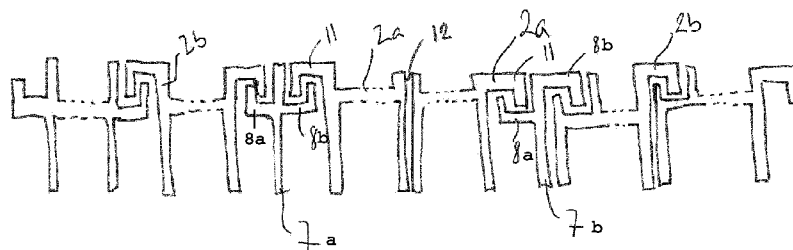


Fig 7

(57) Abstract: A grid module (2a, 2b) for a catalyst support comprising one or more sides arranged with a module connecting part (11) to engage in a tongue/groove connection with a matching receiving connecting part (8a, 8b) on an external structure (7a, 7b).

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2015/056013

A. CLASSIFICATION OF SUBJECT MATTER
INV. B01J8/02 B01J8/04
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)
B01J

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, BIOSIS, COMPENDEX, INSPEC, 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	US 2 483 178 A (BONINGER OTTO R) 27 September 1949 (1949-09-27) column 1, line 1 - line 5 column 2, line 11 - column 3, line 11; claims; figures 2-5 -----	1-17, 19, 20, 22, 24, 25
X	US 2012/014849 A1 (KILLEN RALPH E [US] ET AL) 19 January 2012 (2012-01-19) abstract paragraph [0045] paragraph [0085] - paragraph [0091]; claims; figures 5a, 14a-14f ----- -/--	1-17, 19-25



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

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INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2015/056013

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2 363 623 A (ROACH WENDELL W ET AL) 28 November 1944 (1944-11-28) page 1, left-hand column, line 1 - line 10 page 2, left-hand column, line 36 - right-hand column, line 5; claims; figure 2 -----	1-3,10, 11,13, 15,22, 24,25
X	US 2009/047194 A1 (NASCIMENTO PEDRO [FR] ET AL) 19 February 2009 (2009-02-19) abstract paragraph [0001] - paragraph [0002] paragraph [0010] - paragraph [0016] paragraph [0020] paragraph [0031] - paragraph [0035] paragraph [0042] - paragraph [0052]; claims; figures -----	1-17, 19-25
X	US 3 977 834 A (ALCOCK LESLIE ET AL) 31 August 1976 (1976-08-31) abstract column 1, line 9 - line 38 column 3, line 41 - column 4, line 13; claims; figures 1, 3 -----	16,20, 22,25
X	WO 96/02321 A1 (METHANOL CASALE SA [CH]; BIANCHI LUCA [IT]; RIZZI ENRICO [IT]) 1 February 1996 (1996-02-01) abstract page 1, line 5 - line 13 page 2, line 2 - line 8 page 4, line 8 - line 15 page 5, line 19 - line 31 page 7, line 20 - page 8, line 14 page 11, line 17 - page 12, line 18; claims; figures 1, 5, 6 -----	16-23,25

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2015/056013

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.:

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: 1-25

The following groups have been identified:

1.1. claims: 1-15, 24(completely); 25(partially)

Independent claims 1, 4, 10, 24 and 25 (in part) (and dependent claims 2, 3, 5-9 and 11-15) relate to grid modules, modular catalyst support systems with the grid modules and a reactor comprising the grid modules or modular catalyst support system. The grid modules comprise a one or more sides with a connecting part to engage in a tongue/groove connection.

1.2. claims: 16(completely); 25(partially)

Independent claims 16 and 25 (in part) relate to a frame section comprising two connection parts on each side and a reactor comprising the frame section.

1.3. claims: 17(completely); 25(partially)

Independent claims 17 relates to a modular catalyst support system comprising at least one manway grid module having at least one connecting part and a manway frame having at least one connecting part. Independent claim 25 (in part) relates to a reactor comprising the modular catalyst support system.

1.4. claims: 18(completely); 25(partially)

Independent claims 18 relates to a modular catalyst support system comprising two manway frame sections suspended between two support beams. Independent claim 25 (in part) relates to a reactor comprising the modular catalyst support system.

1.5. claims: 19(completely); 25(partially)

Independent claims 19 relates to a modular catalyst support system wherein each manway frame section comprises two connecting parts one each side. Independent claim 25 (in part) relates to a reactor comprising the modular catalyst support system.

1.6. claims: 20(completely); 25(partially)

Independent claims 20 relates to a modular catalyst support system comprising a connecting part on least one support beam. Independent claim 25 (in part) relates to a reactor comprising the modular catalyst support system.

1.7. claims: 21(completely); 25(partially)

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Independent claims 21 relates to a modular catalyst support system comprising a second manway. Independent claim 25 (in part) relates to a reactor comprising the modular catalyst support system.

1.8. claims: 22(completely); 25(partially)

Independent claims 22 relates to a modular catalyst support system comprising at least one regular grid module. Independent claim 25 (in part) relates to a reactor comprising the modular catalyst support system.

1.9. claims: 23(completely); 25(partially)

Independent claims 23 relates to a modular catalyst support system wherein each manway and regular grid module have connecting parts, which have a U-shape or are a protruding structure. Independent claim 25 (in part) relates to a reactor comprising the modular catalyst support system.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2015/056013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2483178	A	27-09-1949	NONE
US 2012014849	A1	19-01-2012	CA 2805846 A1 26-01-2012 CN 103025420 A 03-04-2013 EP 2595741 A1 29-05-2013 JP 2013538116 A 10-10-2013 KR 20130047743 A 08-05-2013 RU 2013107031 A 27-08-2014 SG 187141 A1 28-02-2013 SG 195539 A1 30-12-2013 US 2012014849 A1 19-01-2012 US 2013082125 A1 04-04-2013 WO 2012011990 A1 26-01-2012
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