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HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

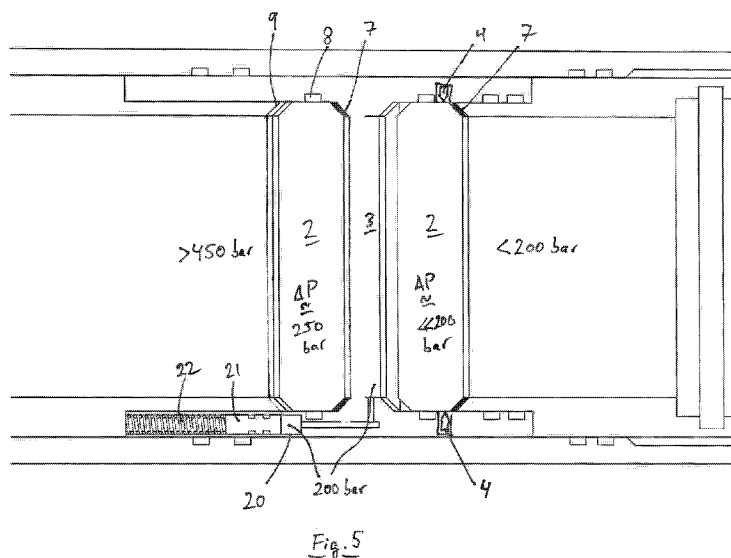
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(54) Title: CRUSHABLE PLUG



(57) Abstract: The present invention relates to a plug (1) comprising at least two discrete glass discs (2), wherein there is provided between the glass discs a liquid (3) which contributes to load uptake and load distribution, and a pin-/claw device (4) is arranged to be pressed in a radial direction into at least one of the glass discs (2). A distinctive feature of the plug is that it does not include a functional drainage system, and the pin-/claw device (4) is arranged such that on activation there occurs a pressure leakage through the glass disc (2). Also suggested according to the invention is a volume compensator/constant pressure regulator (20, 21, 22; 23; 24).

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INTERNATIONAL SEARCH REPORT

International application No PCT/N02014/050035

A. CLASSIFICATION OF SUBJECT MATTER INV. E21B33/12 E21B33/134 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) E21B				
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.		
A	WO 2007/108701 A1 (BJOERGUM MEKANISKE AS [NO]; BJOERGUM STIG OVE [NO]) 27 September 2007 (2007-09-27) claims 1,2,11,12 figures 1,2	1-12		
A	----- WO 2009/110805 A1 (TCO AS [NO]; BRANDSDAL VIGGO [NO]) 11 September 2009 (2009-09-11) abstract	1-12		
A	----- WO 2009/116871 A1 (TCO AS [NO]; BRANDSDAL VIGGO [NO]; SEVATDAL SIGMUND [NO]; KROGENES KAR) 24 September 2009 (2009-09-24) abstract	1-12		
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<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.				
* Special categories of cited documents : <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> "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 </td> <td style="width: 50%; border: none; vertical-align: top;"> "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 </td> </tr> </table>			"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
"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 March 2015	24/03/2015			
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INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>WO 2005/049961 A1 (TC PLUG TECHNOLOGY A S [NO]; SOERENSEN TORE HASSEL [NO]) 2 June 2005 (2005-06-02) the whole document</p> <p style="text-align: center;">-----</p>	1-12
A	<p>WO 2009/126049 A1 (TCO AS [NO]; BRANDSDAL VIGGO [NO]) 15 October 2009 (2009-10-15) abstract</p> <p style="text-align: center;">-----</p>	1-12
A	<p>WO 2009/041823 A1 (VOSSTECH AS [NO]; BJOERGUM STIG OVE [NO]) 2 April 2009 (2009-04-02) page 7, line 22 - page 9, line 23 figures 1,2,5</p> <p style="text-align: center;">-----</p>	1-12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/N02014/050035

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: 1-6, 12

A plug not including a functional drainage system

2. claims: 7-11

A plug including a volume compensator/constant pressure
regulator

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/N02014/050035

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2007108701 A1	27-09-2007	AT 517229 T	15-08-2011
		BR PI0709104 A2	28-06-2011
		DK 2002080 T3	24-10-2011
		EP 2002080 A1	17-12-2008
		NO 325431 B1	28-04-2008
		US 2009101358 A1	23-04-2009
		WO 2007108701 A1	27-09-2007

WO 2009110805 A1	11-09-2009	AU 2009220312 A1	11-09-2009
		CA 2716030 A1	11-09-2009
		EP 2252765 A1	24-11-2010
		NO 331150 B1	24-10-2011
		RU 2010138977 A	20-04-2012
		US 2011000663 A1	06-01-2011
		WO 2009110805 A1	11-09-2009

WO 2009116871 A1	24-09-2009	NONE	

WO 2005049961 A1	02-06-2005	AT 396323 T	15-06-2008
		BR PI0416803 A	09-01-2007
		CA 2587395 A1	02-06-2005
		CN 1910336 A	07-02-2007
		DK 1697614 T3	01-09-2008
		EP 1697614 A1	06-09-2006
		ES 2308291 T3	01-12-2008
		HK 1094978 A1	15-08-2008
		NO 321976 B1	31-07-2006
		RU 2361061 C2	10-07-2009
		US 2007163776 A1	19-07-2007
		WO 2005049961 A1	02-06-2005

WO 2009126049 A1	15-10-2009	AU 2009234512 A1	15-10-2009
		CA 2716064 A1	15-10-2009
		EP 2276907 A1	26-01-2011
		NO 328577 B1	22-03-2010
		RU 2010138976 A	20-05-2012
		US 2011000676 A1	06-01-2011
		WO 2009126049 A1	15-10-2009

WO 2009041823 A1	02-04-2009	EP 2201214 A1	30-06-2010
		NO 328882 B1	07-06-2010
		US 2010236793 A1	23-09-2010
		WO 2009041823 A1	02-04-2009
