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[Continued on next page]

(54) Title: A METHOD AND A DEVICE FOR MAKING A MULTI-COMPONENTS PRODUCT MATERIAL

Fig. 17

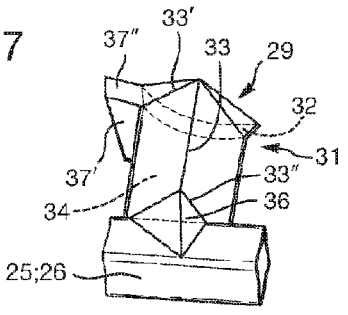
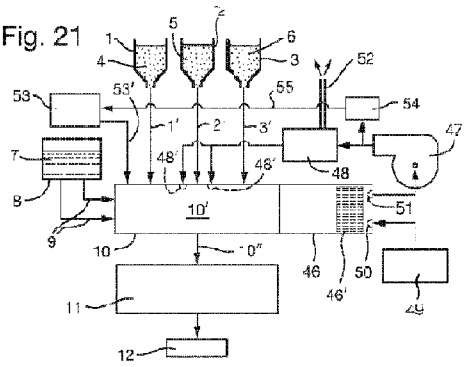


Fig. 21



(57) Abstract: In a method and a device for making of a multi-components product material (12) there is a processing and homogenizing chamber (10') for primary particle components (4; 5; 6), the chamber having at least two sets (13; 14; 13'; 14') of rotary shovels caused to rotate in parallel in a mutually counter-rotating, homogenizing mode; inlet(s) (9; 9') into the chamber (10') for at least one secondary component (7; 7') in a fluid state and/or fine particulate material state and which is to interact with the primary components (4; 5; 6) while they are moved around in the processing chamber (10') by sets of the rotary shovels, and an outlet (42; 43) in a bottom region (40; 41) of the chamber (10') to allow the primary and secondary components to leave the chamber as the multi-component product material (12). At least some of the primary components (4; 5; 6) may be pre-heated before entering the chamber (10') and/or at least one heating agent is entered into to the processing chamber (10') to heat at least partly the primary components (4: 5; 6). The shovels (15 -19; 20 -24) of each set (13; 14; 13'; 14') extend radially from a respective surface of a common rotary shaft (25 –26). Each shovel (29) present upon rotation a convex surface (30) to face the primary component(s) (4: 5; 6) to be homogenized, and is at an radially outer region (31) is forwardly with a forward face (32) forming an angle with sad convex surface, and wherein an aerodynamic member (33) extends rearwards from a rear concave side (34) of the shovel, transversely of a radial direction of the shovel. A lateral wing member (37) may be placed on the shovel.

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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
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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)
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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2010/011171 A1 (NCC ROADS AB [SE]; LUNDBERG ROGER [SE]) 28 January 2010 (2010-01-28)	1,3,4, 9-13,17, 19-23, 27-30, 34,36, 38-41,46
Y	page 1, line 3 - line 7 page 3, line 25 - page 4, line 5 page 8, line 23 - page 9, line 15 page 10, line 27 - page 11, line 18 page 11, line 23 - page 12, line 15	2,5-8, 14-16, 24,25, 31-33, 37,42-44
A	figures	18,35, 47-52

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

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Date of the actual completion of the international search	Date of mailing of the international search report
10 December 2014	17/12/2014

Name and mailing address of the ISA/	Authorized officer
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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.
X	EP 1 408 157 A2 (OHLSON KARL GUNNAR [SE]) 14 April 2004 (2004-04-14)	1,3,4, 9-13,17, 19-23, 27-30, 34,36, 38-41,46
Y	paragraph [0015] paragraph [0017] paragraph [0027] paragraph [0033] figures	2,5-8, 14-16, 24,25, 31-33, 37,42-44
A		18,35, 47-52

Y	WO 93/09295 A1 (HOVE LEO [DK]) 13 May 1993 (1993-05-13)	2,5,8, 24,42
A	page 1, paragraph 1 page 5, paragraph 2 page 7, paragraph 2 example 2	1,3,4,6, 7,9-23, 25, 27-41, 43,44, 46-52

Y	US 2007/060676 A1 (REINKE GERALD H [US]) 15 March 2007 (2007-03-15)	6,7
A	paragraph [0002] paragraph [0009]	1-5, 8-23,25, 27-44, 46-52

Y	US 2013/058719 A1 (WARLOW JERRY L [US] ET AL) 7 March 2013 (2013-03-07)	14-16, 25, 31-33, 43,44
A	paragraph [0001] paragraph [0050] - paragraph [0053] paragraph [0061] paragraph [0067] - paragraph [0068] paragraph [0082] figures 1-3,5,7,8	18,35, 47,52

Y	EP 1 990 085 A2 (PELLETING TECHNOLOGY NEDERLAND [NL]) 12 November 2008 (2008-11-12)	14-16, 25, 31-33, 43,44
A	paragraph [0001] - paragraph [0002] paragraph [0014] figures 1,3	18,35, 47,52

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INTERNATIONAL SEARCH REPORT

International application No
PCT/NO2014/050081

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	column 1, line 5 - line 14 column 5, line 28 - line 32 column 6, line 55 - column 7, line 2 column 7, line 37 - line 41 figures 1-3	31-35, 37, 42-44, 47,49,52
A	GB 2 073 034 A (BHS BAYERISCHE BERG) 14 October 1981 (1981-10-14) page 1, line 3 - line 10 page 1, line 95 - line 107 page 1, line 32 - line 73 figures	48-51
A	DE 20 2009 010658 U1 (SCHROEDER MASCHB KG [DE]) 23 December 2010 (2010-12-23) paragraph [0001] paragraph [0015] - paragraph [0018] figures 1-2	48-51
A	DE 462 977 C (BHS BAYERISCHE BERG) 20 July 1928 (1928-07-20) page 1, line 1 - line 17 page 2, line 1 - line 37 figures	48-51

INTERNATIONAL SEARCH REPORT

International application No.
PCT/NO2014/050081

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.:

1-25, 27-44, 46-52

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: 1-13, 17, 19-24, 27-30, 34, 36, 38-42, 46

Method and apparatus for making a multi-components product material comprising primary and secondary components, wherein the secondary component is a mixture of a fluid and a fine particulate material.

1.1. claims: 2, 4-13, 17, 19-24, 27

Method and apparatus for making a multi-components product material comprising primary and secondary components, wherein after a secondary component in a fluid state and/or fine particulate material state is added, a second batch of primary particle components is supplied and a further supply of one secondary component is added.

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2. claims: 14-16, 18, 25, 31-33, 35, 43, 44, 47, 52

Method and apparatus for making a multi-components product material comprising primary and secondary components, wherein a heating agent is supplied into the processing chamber.

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3. claims: 26, 45

Method and apparatus for making a multi-components product material comprising primary and secondary components, wherein the direction of shaft rotation of at least one shaft is reversed upon a phase of operation involving the final product to leave the processing chamber.

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4. claim: 37

Apparatus for making a multi-components product material comprising primary and secondary components, wherein a pressure operated mould is arranged upstream of the apparatus.

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5. claims: 48-51

Method and apparatus for making a multi-components product material comprising primary and secondary components, wherein the apparatus comprises mixing shovels having a specific design.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
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