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(54) Title: THERMOPLASTIC POLYAMIDE COMPONENTS, AND COMPOSITIONS AND METHODS FOR THEIR PRODUCTION AND INSTALLATION

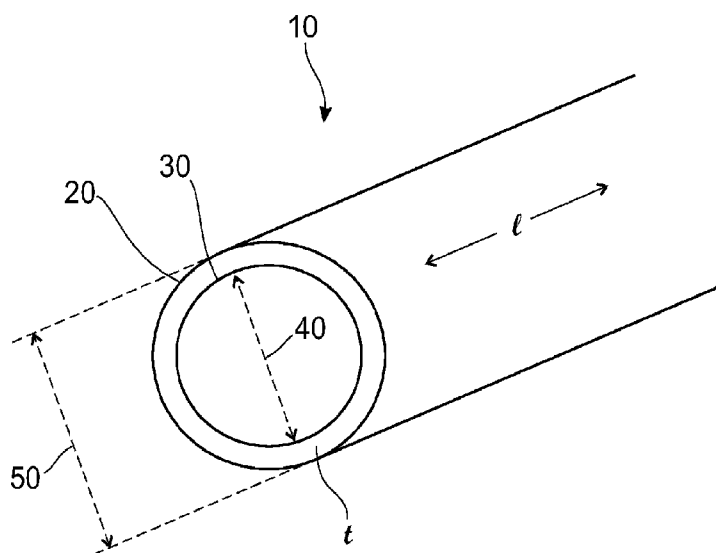


FIG. 1

(57) Abstract: Thermoplastic polyamide containing components, as well as compositions, articles of manufacture, and methods for their production and installation are provided.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
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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)
C08L F16L

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	US 2012/000562 A1 (HOFFMANN BOTHO [CH] ET AL) 5 January 2012 (2012-01-05) claim 1 page 7, paragraph [0120] - paragraph [0124] page 8; examples V1, V5; table 3 page 8, paragraph [0125]	1-22,42, 75-91, 105-114, 118,128
X	US 2011/023986 A1 (HOFFMANN BOTHO [CH] ET AL) 3 February 2011 (2011-02-03) page 9; example V1; table 3 ----- -/--	1-22,42, 75-91, 105-114, 118,128

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 17 March 2014	Date of mailing of the international search report 02/07/2014
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Barrère, Matthieu

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/075800

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 1 510 743 A2 (REHAU AG & CO [DE]) 2 March 2005 (2005-03-02)	1-22,42, 75-91, 118,128
A	page 4; example 1 page 5; table 1 page 5, line 23 - line 24 -----	105-114
X	US 6 759 480 B1 (BOUILLOUX ALAIN [FR] ET AL) 6 July 2004 (2004-07-06)	1-22,42, 75-91, 118,128
A	column 9, line 24 - line 26 column 9, line 55 - line 58 column 10; example 2; table 1 -----	105-114
X	US 6 075 116 A (MORIWAKI TAKESHI [JP] ET AL) 13 June 2000 (2000-06-13)	1-22
A	column 13, line 13 - line 32 columns 14-15, table 2-2, example 2.1 -----	42, 75-91, 105-114, 118,128
A	André Sturzel: "GreenLine 09-2011 - Bio based Polyamides from EMS-GRIVORY Page 1 Bio based Polyamides from EMS-GRIVORY", 1 September 2011 (2011-09-01), XP055106320, Retrieved from the Internet: URL: http://www.erp.se/pdf/GreenLine.pdf [retrieved on 2014-03-07] page 32 -----	1-22,42, 75-91, 105-114, 118,128

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/075800

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.:

1-22, 42, 105-114, 118(completely); 75-91, 128(partially)

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: 1-22, 42, 105-114, 118(completely); 75-91, 128(partially)

Composition comprising (a) 60 to 99.9% by weight of a polyamide; and (b) 0.5 to 40% by weight of an impact modifier containing maleic anhydride or a functional equivalent thereof; wherein the composition has a moisture level less than the equilibrium moisture content of the polyamide. Articles made from the said composition.

2. claims: 23-29, 43(completely); 75-91, 128(partially)

Extrudable thermoplastic resin having a melt strength of at least 0.08N, said thermoplastic resin comprising (a) 60 to 99.9% by weight of a polyamide and (b) 0.5 to 40% by weight of an impact modifier. Articles made from the said resin.

3. claims: 30-37, 44, 117, 119-127(completely); 75-91, 128(partially)

Extrudable thermoplastic resin comprising (a) 60 to 99.9% by weight of a polyamide; and (b) 0.5 to 40% by weight of an impact modifier, wherein said extrudable thermoplastic resin is capable of forming a pipe. Articles made from the said resin.

4. claims: 38-41, 45(completely); 75-91, 128(partially)

Extrudable thermoplastic resin comprising a polyamide and having a shear viscosity from 500 to 3000 Pa.sec when tested at a shear rate of 50 sec⁻¹ and a melt temperature of 270-280°C, and a moisture level from 0.03 to 0.15%. Articles made from the said resin.

5. claims: 46-57(completely); 75-91, 128(partially)

Extruded thermoplastic pipe comprising a polyamide and having a quick burst stress with water saturation of at least 4000 psi when tested at 23°C.

6. claims: 58-64(completely); 75-91, 128(partially)

Extruded thermoplastic pipe comprising a polyamide and having a shear relative viscosity below 1000 Pa.sec when tested at a shear rate of 50 sec⁻¹ and a melt temperature of 270-280°C, and a moisture level from 0.03 to 0.15%.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

7. claims: 65-69(completely); 75-91, 128(partially)

Extruded thermoplastic pipe comprising a polyamide and made with a swell ratio ranging from 0.5 to 2.5.

8. claims: 70-74(completely); 75-91, 128(partially)

Extruded thermoplastic pipe comprising a polyamide and made in a die having an orientation ratio ranging from 2 to 30.

9. claims: 92-94(completely); 128(partially)

Extruded thermoplastic pipe comprising a polyamide which maintains its ovality and can be coiled for transport and storage.

10. claims: 95-104

Process for extruding a thermoplastic pipe, said process comprising extruding a melted polyamide containing thermoplastic resin with a moisture level less than the equilibrium moisture content of the polyamide and passing the extruded polyamide containing thermoplastic resin through a pipe forming zone of the extrusion apparatus to form the thermoplastic pipe.

11. claims: 115, 116, 129, 130

Article of manufacture comprising a coiled pipe, said pipe being extruded from a polyamide containing thermoplastic resin.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2013/075800

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