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- (71) Applicant (for all designated States except US): **CRY-
OVAC, INC.** [US/US]; Post Office Box 464, 100 Rogers
Bridge Rd., Duncan, SC 29334 (US).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **FERRI, Isabella**
[IT/IT]; Via Poggi, 60, IT-40068 San Lazzaro di Savena,
Bologna (IT).
- (74) Agents: **HURLEY, Jr., Rupert, B.** et al.; Cryovac, Inc.,
Post Office Box 464, 100 Rogers Rd., Duncan, SC 29334
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(54) Title: IRRADIATED MULTILAYER FILM HAVING SEAL LAYER CONTAINING HYPERBRANCHED POLYMER

(57) Abstract: An irradiated multilayer film has a first layer and a second layer. The first layer is an outer heat seal layer containing a blend of a highly branched homogenous polymer and a semicrystalline polymer. The highly branched homogenous polymer has at least 40 branches per 1000 methylene groups, an M_w/M_n less than 3.0, and a density of less than 0.89 g/cc. The highly branched homogenous polymer is present in an amount of from about 5 to 50 weight percent, based on layer weight. The semicrystalline polyolefin has a density of at least 0.90 g/cc. The semicrystalline polyolefin is present in an amount of from about 50 to 95 weight percent, based on total layer weight. The second layer contains a thermoplastic polymer in a crosslinked polymer network. A process for making a packaging article includes coextruding the first and second layers, irradiating the resulting multilayer film, and thereafter heat sealing the first layer to itself or another component of the packaging article.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 02/35366

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B32B27/32 B65D65/40 C08L23/08 B32B27/08

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)
IPC 7 B32B B65D C08L

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 practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 397 613 A (GEORGELOS PAUL N) 14 March 1995 (1995-03-14) claims 1,3-11,16,17,19 column 11, line 40 -column 12, line 4 examples tables C,M ---	1-4,6,9, 13
X	EP 0 801 096 A (GRACE W R & CO) 15 October 1997 (1997-10-15) claims 1-6,9-12 page 4, line 25 - line 37 page 5, line 27 - line 32 page 10, line 20 - line 21 examples 17-19 table 5 --- -/--	1-4,6,7

Further documents are listed in the continuation of box C.

Patent family members are listed in 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 document 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

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11 April 2003

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Name and mailing address of the ISA
European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Hillebrand, G

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	US 5 288 531 A (FALLA DANIEL J ET AL) 22 February 1994 (1994-02-22) claims 1,2,12,10,12-18 ---	1
A	US 5 942 579 A (FALLA DANIEL JAMES ET AL) 24 August 1999 (1999-08-24) claims 1,6 column 4, line 50 - line 57 ---	1
A	US 6 106 935 A (LAMBERT W SCOTT ET AL) 22 August 2000 (2000-08-22) claims 1,2,5,10 -----	7

INTERNATIONAL SEARCH REPORT

International application No.
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Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

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 fee, this Authority did not invite payment of any additional fee.

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.:

1-3, 6-13

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

1. Claims: 1-3,6-13

An irradiated multilayer film comprising a second layer containing a thermoplastic polymer in a crosslinked network, and a first layer, which comprises a blend of two polymers, in which the first polymer is a highly branched homogeneous copolymer of ethylene and an alpha-olefine with a density of less than 0,89 g/cc in combination with a semicrystalline polyolefin having a density of at least 0,90 g/cc, being very low density polyethylene.

2. Claims: 4-5 (in part)

An irradiated multilayer film comprising a second layer containing a thermoplastic polymer in a crosslinked network, and a first layer, which comprises a blend of two polymers, in which the first polymer is a highly branched homogeneous homopolymer of ethylene with a density of less than 0,89 g/cc in combination with a semicrystalline polyolefin having a density of at least 0,90 g/cc.

3. Claims: 4-5 (in part)

An irradiated multilayer film comprising a second layer containing a thermoplastic polymer in a crosslinked network, and a first layer, which comprises a blend of two polymers, in which the first polymer is a highly branched homogeneous polymer with a density of less than 0,89 g/cc in combination with a semicrystalline polyolefin having a density of at least 0,90 g/cc, being linear low density polyethylene.

4. Claims: 4-5 (in part)

An irradiated multilayer film comprising a second layer containing a thermoplastic polymer in a crosslinked network, and a first layer, which comprises a blend of two polymers, in which the first polymer is a highly branched homogeneous polymer with a density of less than 0,89 g/cc in combination with a semicrystalline polyolefin having a density of at least 0,90 g/cc, being low density polyethylene.

5. Claims: 4-5 (in part)

An irradiated multilayer film comprising a second layer containing a thermoplastic polymer in a crosslinked network, and a first layer, which comprises a blend of two polymers, in which the first polymer is a highly branched homogeneous polymer with a density of less than 0,89 g/cc in combination with a semicrystalline polyolefin having a density of at least 0,90 g/cc, being high density polyethylene.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

6. Claims: 4-5 (in part)

An irradiated multilayer film comprising a second layer containing a thermoplastic polymer in a crosslinked network, and a first layer, which comprises a blend of two polymers, in which the first polymer is a highly branched homogeneous polymer with a density of less than 0,89 g/cc in combination with a semicrystalline polyolefin having a density of at least 0,90 g/cc, being propylene homopolymer or copolymer.

7. Claims: 4-5 (in part)

An irradiated multilayer film comprising a second layer containing a thermoplastic polymer in a crosslinked network, and a first layer, which comprises a blend of two polymers, in which the first polymer is a highly branched homogeneous polymer with a density of less than 0,89 g/cc in combination with a semicrystalline polyolefin having a density of at least 0,90 g/cc, being a linear homogeneous ethylene/alpha-olefine copolmyer.

8. Claims: 4-5 (in part)

An irradiated multilayer film comprising a second layer containing a thermoplastic polymer in a crosslinked network, and a first layer, which comprises a blend of two polymers, in which the first polymer is a highly branched homogeneous polymer with a density of less than 0,89 g/cc in combination with a semicrystalline polyolefin having a density of at least 0,90 g/cc, being a homogeneous ethylene/alpha-olefin copolymer having long chain branching.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
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