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(54) Title: ULTRA VIOLET LIGHT RESISTANT LAMINATE, AND PROCESS OF MANUFACTURING THE SAME

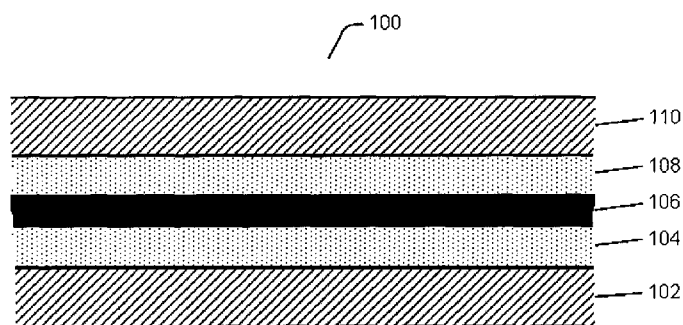


Fig. 1

(57) Abstract: The present disclosure relates to a laminate comprising: an outer polyethylene layer comprising at least 10% on the weight of polyethylene, a UV radiation blocking agent or a chromophore; a barrier layer with at least 15%-50% of an aromatic polyamide; and a polyethylene sealant layer. The Ultra Violet radiation resistant laminate is an opaque laminate or a transparent laminate. The outer polyethylene layer and the barrier layer with at least one aromatic polyamide is a multilayer film, preferably three layer film. The present disclosure also relates to a process for the preparation of the laminate.



INTERNATIONAL SEARCH REPORT

International application No.

PCT/IN12/00379

A. CLASSIFICATION OF SUBJECT MATTER

IPC - B32B 27/34; G02B 5/28; B32B 27/08 (2020.01)

CPC - G02B 5/283; B32B 27/34; G02B 5/208, 5/287

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)

See Search History document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

See Search History document

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

See Search History document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y --- A	US 2011/0027428 A1 (BEKELE, S) 03 February 2011; abstract, paragraphs [0125]-[0129], [0133], [0138], [0141], [0151], Tables 1, 2	1-3, 5-15, 19 --- 4, 16, 18
Y --- A	JPH 11-105203 A (DAINIPPON PRINTING CO LTD) 20 April 1999; see machine translation	1-3, 5-15, 19 --- 4, 16, 18
Y --- A	US 2008/0038533 A1 (BEST, S et al.) 14 February 2009; paragraphs [0065], [0066]	3, 14 --- 4
Y	US 2003/0235701 A1 (KLIESCH, H et al.) 25 December 2003; paragraphs [0013], [0089], [0090]	5, 6
Y	US 2006/0106193 A1 (MORIYAMA, H et al.) 18 May 2006; paragraph [0103]	8
A	US 2011/0083765 A1 (STARK, K et al.) 14 April 2011; paragraphs [0037], [0097], [0098], [0103]-[0107]	1-16, 18, 19

☐ 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

"D" document cited by the applicant in the international application

"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

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/IN12/00379

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 extra 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 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.:
1-16, 18, 19

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.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IN12/00379

-Continued from Box No. III Observations where unity of invention is lacking-

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fee must be paid.

Group I: Claims 1-16 & 18-19 are directed towards a UV radiation resistant laminate comprising layers of specific thicknesses.

Group II: Claims 1-15 & 17-19 are directed towards a laminate comprising polyamide layers.

Group III: Claims 1-15 & 18-20 are directed towards a process for preparation of a laminate.

The inventions listed as Groups I-III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

The special technical features of Group I include at least an outer polyethylene layer (110) comprises at least 10% on the weight of polyethylene, a UV radiation blocking agent or a chromophore having a thickness of 100 μ , which are not present in Groups II-III.

The special technical features of Group II include at least a polyamide layer (206) comprises UV blocking amorphous aromatic polyamide and semi crystalline aliphatic polyamide; and a polyamide layer (207) comprises UV blocking amorphous aromatic polyamide and semi crystalline aliphatic polyamide, which are not present in Groups I and III.

The special technical features of Group III include at least co-extruding outer layer, barrier layer and sealant layers independently as films; adhering through extrusion lamination of outer layer, barrier layer and one 20 μ Low density polyethylene (LDPE) material film; and adhering the sealant layer by extrusion lamination of 20 μ Low density polyethylene (LDPE) layer, which are not present in Groups I-II.

The common technical features shared by Groups I-III are a UV radiation resistant laminate comprising: an outer polyethylene layer comprises at least 10% on the weight of polyethylene, a UV radiation blocking agent or a chromophore; a barrier layer with at least 15%-50% of an aromatic polyamide; and a polyethylene sealant layer; a first tie layer of maleic anhydride grafted polyethylene; and a second tie layer of maleic anhydride grafted polyethylene.

However, these common features are previously disclosed by US 2011/0027428 A1 (BEKELE) in view of JPH 11-105203 A to Dainippon Printing Co Ltd (hereinafter "DAINIPPON"). BEKELE discloses a laminate (a film (laminate); abstract) comprising: an outer polyethylene layer comprising at least 10% on the weight of polyethylene, a UV radiation blocking agent or a chromophore (layer G (outer polyethylene layer), which comprises 35% on the weight of polyethylene, as shown at Ex. 1 of Table 2; paragraphs [0141], [0151], Table 1); a barrier layer with a polyamide (layers C, D, and E collectively form a barrier layer, which comprises nylon 6 (polyamide); paragraph [0126], Table 1, Ex. 1 of Table 2); and a polyethylene sealant layer (layer A (polyethylene sealant layer), which comprises polyethylene, functions as a sealant layer; paragraph [0138], Ex. 1 of Table 2); a first tie layer of maleic anhydride grafted polyethylene (tie layer B formed of maleic anhydride grafted low density polyethylene; paragraph [0133]); and a second tie layer of maleic anhydride grafted polyethylene (tie layer F formed of maleic anhydride grafted low density polyethylene; paragraph [0133]). BEKELE fails to disclose that the laminate is UV radiation resistant and the barrier layer having 15-50% of an aromatic polyamide. DAINIPPON discloses a UV radiation resistant laminate (ultraviolet ray blocking laminated sheet 10B (Ultra Violet radiation resistant laminate); paragraph [0011], figure 1B) and the barrier layer having at least 15-50% of an aromatic polyamide (gas barrier layer 3 is formed entirely of an aromatic polyamide, which is at least 15-50% of the aromatic polyamide; paragraphs [0012], [0015]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the laminate of BEKELE to be a UV radiation resistant laminate with at least 15-50% of an aromatic polyamide in the barrier layer, as taught by DAINIPPON, in order to gain the advantages of blocking chemical changes of a protected substance due to interaction ultraviolet radiation and gas, such as oxygen, with a single laminate (see paragraph [0004] of DAINIPPON).

Since the common technical features are previously disclosed by BEKELE in view of DAINIPPON, these common features are not special and so Groups I-III lack unity.