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(54) Title: MULTILAYER FILMS SUITABLE FOR USE IN THERMOFORMING APPLICATIONS

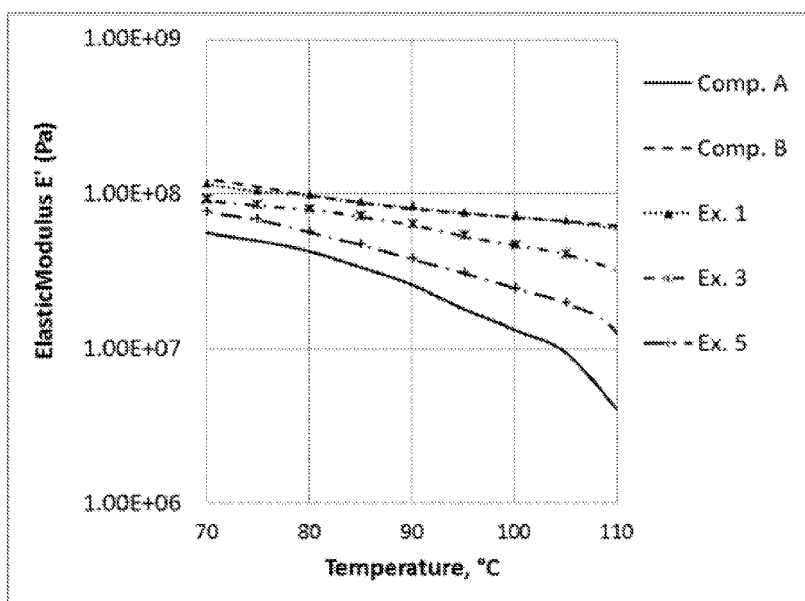


Figure 1

(57) Abstract: The present invention provides multilayer films. In some embodiments, multilayer films of the present invention are desirable for use in thermoforming applications. In one aspect, a multilayer film comprises a first layer comprising polypropylene, polyethylene, or blends thereof, a second layer comprising polypropylene, polyethylene, or blends thereof, and a third layer between the first layer and the second layer, the third layer comprising polypropylene, polyethylene, or blends thereof, wherein at least one of the layers further comprises a cyclic olefin copolymer and wherein the multilayer film comprises at least 1 weight percent and less than 5 weight percent cyclic olefin copolymer based on the total weight of the film.





SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
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A. CLASSIFICATION OF SUBJECT MATTER
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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.
Y	WO 2004/024433 A2 (DOW GLOBAL TECHNOLOGIES INC [US]; SAAVEDRA JOSE V [US]; PATEL RAJEN [U]) 25 March 2004 (2004-03-25) claims 1-2,9-10,29,-30,36-3,44-45,48; table II -----	1-15
Y	EP 1 747 882 A1 (GUNZE KK [JP]) 31 January 2007 (2007-01-31) paragraphs [0013], [0015], [0023] - [0024], [0031], [0033], [0046], [0050] - paragraphs [0064], [0068], [0076], [0127], [0130] - [0131]; claims 1, 11; examples 1-2, COMP.EX 4 ----- -/--	1-15

Further documents are listed in the continuation of Box C.

See patent family annex.

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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, Fax: (+31-70) 340-3016	Authorized officer Derz, Thomas
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International application No
PCT/US2016/066254

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 102 38 515 A1 (TICONA GMBH [DE]) 4 March 2004 (2004-03-04) paragraphs [0005], [0007] - [0008], [0011], [0021] - [0022], [0030] - [0033], [0039], [0049]; claims 1-5; table 2 -----	1-15
X	US 2005/244665 A1 (RIVETT JANET W [US] ET AL) 3 November 2005 (2005-11-03) paragraphs [0011], [0016], [0029] - [0030] - paragraphs [0061], [0068] - [0069], [0071], [0085] - [0088], [0092]; claims 1,3-5, 7, 14; examples; table -----	1
A	EP 2 351 644 A1 (KUHNE ANLAGENBAU GMBH [DE]) 3 August 2011 (2011-08-03) paragraphs [0042], [0044]; claims 1-4, 12 -----	9-12,15
Y	WO 2007/075473 A1 (CRYOVAC INC [US]; RIVETT JANET [US]; MUELLER WALTER B [US]) 5 July 2007 (2007-07-05) claims 1, 9, 11, 20, 22, 24; examples B, J, L, P; table 1 -----	1-15

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2016/066254

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
WO 2004024433	A2	25-03-2004	AU 2003268092 A1	30-04-2004
			BR 0314444 A	19-07-2005
			CN 1681650 A	12-10-2005
			EP 1539489 A2	15-06-2005
			ES 2490717 T3	04-09-2014
			JP 4495590 B2	07-07-2010
			JP 2005538867 A	22-12-2005
			KR 20050049494 A	25-05-2005
			MX PA05002885 A	05-10-2005
			US 2006057410 A1	16-03-2006
			WO 2004024433 A2	25-03-2004
EP 1747882	A1	31-01-2007	CA 2566479 A1	24-11-2005
			CN 1960868 A	09-05-2007
			EP 1747882 A1	31-01-2007
			JP 4604025 B2	22-12-2010
			KR 20070041439 A	18-04-2007
			US 2008050651 A1	28-02-2008
			WO 2005110746 A1	24-11-2005
DE 10238515	A1	04-03-2004	AU 2003255450 A1	11-03-2004
			DE 10238515 A1	04-03-2004
			WO 2004018198 A2	04-03-2004
US 2005244665	A1	03-11-2005	AU 2005239990 A1	17-11-2005
			EP 1746905 A1	31-01-2007
			JP 2007537058 A	20-12-2007
			NZ 550735 A	26-02-2010
			US 2005244665 A1	03-11-2005
			WO 2005107502 A1	17-11-2005
EP 2351644	A1	03-08-2011	AT 512794 T	15-07-2011
			AT 547245 T	15-03-2012
			AU 2007283094 A1	14-02-2008
			AU 2011201931 A1	19-05-2011
			BR PI0715411 A2	02-07-2013
			CA 2660139 A1	14-02-2008
			CN 101516619 A	26-08-2009
			CN 102717563 A	10-10-2012
			DE 102006036844 B3	03-01-2008
			DE 202006020148 U1	06-12-2007
			DK 2051854 T3	25-07-2011
			DK 2298549 T3	18-06-2012
			DK 2351644 T3	26-11-2012
			DK 2351645 T3	17-06-2013
			DK 2351646 T3	07-01-2013
			EP 2051854 A1	29-04-2009
			EP 2298549 A1	23-03-2011
			EP 2351644 A1	03-08-2011
			EP 2351645 A1	03-08-2011
			EP 2351646 A1	03-08-2011
			ES 2366859 T3	26-10-2011
			ES 2383500 T3	21-06-2012
			ES 2396620 T3	22-02-2013
ES 2396929 T3	01-03-2013			
ES 2402917 T3	10-05-2013			
JP 4980426 B2	18-07-2012			
JP 2010500187 A	07-01-2010			

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2016/066254

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		KR 20090029825 A	23-03-2009
		NZ 574319 A	30-09-2010
		PT 2051854 E	01-07-2011
		PT 2298549 E	18-05-2012
		PT 2351644 E	23-11-2012
		PT 2351645 E	30-04-2013
		PT 2351646 E	06-02-2013
		RS 51709 B	31-10-2011
		RS 52586 B	30-04-2013
		RS 52587 B	30-04-2013
		RS 52717 B	30-08-2013
		RU 2009102523 A	20-09-2010
		SI 2051854 T1	30-09-2011
		SI 2298549 T1	31-07-2012
		SI 2351645 T1	28-06-2013
		UA 91297 C2	12-07-2010
		US 2010003432 A1	07-01-2010
		US 2014044902 A1	13-02-2014
		WO 2008017453 A1	14-02-2008
		ZA 200900763 B	30-12-2009
WO 2007075473	A1	05-07-2007	AU 2006332005 A1
			CA 2634741 A1
			EP 1963098 A1
			US 2007141366 A1
			WO 2007075473 A1