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(71) Applicant: **Munksjö Oyj**
00130 Helsinki (FI)

(72) Inventors:
- **Gauthier, Gilles**
  38150 SALAISE SUR SANNE (FR)
- **Venot, Alexandra**
  75011 PARIS (FR)
- **Lemonnier, Anthony**
  1332 GENVAL (BE)

(74) Representative: **Nony**
3, rue de Penthièvre
75008 Paris (FR)

(54) **Twisting paper**

(57) The present invention provides a twisting paper substrate to be waxed for the production of an opaque waxed paper wrapping, wherein the paper substrate comprises a fibrous base, at least one opacifying additive and at least one binder reducing penetration of wax in the fibrous base during the production of the waxed paper substrate by application of wax on the paper substrate, wherein the difference of opacity of the paper substrate before and after Cobb test according to the rizinus Cobb method on one side to be waxed of the paper substrate is most preferably less than or equal to 8 percent.

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Description

[0001] The present invention relates to paper wrapping applications.

[0002] The invention relates more particularly to paper used for wrapping individual food products such as pieces of candy.

[0003] Such paper is usually referred to as twisting paper and must be able to withstand the twisting involved in the high speed wrapping operation without tearing.

[0004] It must also show stable twist retention and protect the freshness of the candy while at the same time not allow the candy to stick to the inside of the paper. For this reason, the paper is waxed.

[0005] US 3 865 664 discloses an example of a twisting paper.

[0006] US 4 842 187 discloses an opaque biaxially drawn oriented thermoplastic film.

[0007] Opacity is one of the most important property in paper wrapping applications such as confectionary. Opaque wrapping enables to hide the wrapped product.

[0008] Opacifying additives are added in the paper to achieve high levels of opacity of the paper wrapping.

[0009] Application FR 2 685 704 A1 describes the use of TiO_2 particles as opacifying additive.

[0010] However, opacifying additives add significant costs.

[0011] Hence, there is a need to decrease the amount of opacifying additives added in twisting paper while maintaining their other required properties and the opacity of the paper wrapping or to benefit from a higher opacity at equal opacifying additive contents.

[0012] The present invention provides a twisting paper substrate to be waxed for the production of an opaque waxed paper wrapping, wherein the paper substrate comprises a fibrous base, at least one opacifying additive and at least one binder reducing penetration of wax in the fibrous base during the production of the waxed paper substrate by application of wax on the paper substrate, wherein the difference of opacity of the paper substrate before and after Cobb test according to the rizinus Cobb method on one side to be waxed of the paper substrate is most preferably less than or equal to 8 percent.

[0013] This difference of opacity may notably be less than or equal to 5 percent.

[0014] The binder leads to a decrease of wax penetration in the fibrous base during the production of the waxed paper substrate by application of wax on the paper substrate. Thus, less wax is needed, which leads to an increase of the opacity of the waxed paper substrate. Less opacifying additive is added in the paper substrate to achieve a given level of opacity of the waxed paper substrate, which reduces costs. Additional cost reduction is achieved thanks to the reduction of the wax amount. Furthermore, the reduction of the wax amount may make it easier to claim paper compostability and the waxed paper may be considered as mono-material thus decreasing the green dot fees. In addition, the wax reduction allows a better runnability on waxing machines due to the possibility to run faster and with a more stable process.

[0015] Another aspect of the invention relates to a waxed paper wrapping, comprising the paper substrate according to the invention and a coating of wax on at least one side of the paper substrate.

[0016] A further object of the present invention is a method for producing the paper substrate according to the invention, wherein the at least one binder is applied on at least one side, preferably on both sides, of a paper web comprising the fibrous base, preferably using a metered size press.

[0017] A further object of the present invention is a method for producing a twisting paper substrate to be waxed for the production of an opaque waxed paper wrapping, wherein the paper substrate comprises a fibrous base, at least one opacifying additive and at least one binder reducing penetration of wax in the fibrous base during the production of the waxed paper substrate by application of wax on the paper substrate, wherein the binder is applied on at least one side to be waxed of a paper web comprising the fibrous base.

[0018] The present invention also provides a method for producing a waxed paper wrapping according to the invention, comprising the production of the paper substrate according to the invention and application of the wax on the paper substrate.

[0019] The present invention also provides a method for packaging food, comprising twisting around the food a waxed paper wrapping according to the invention.

[0020] Another aspect of the invention relates to a packaged food product comprising a food product and a waxed paper wrapping according to the invention, twisted around the food product.

Opacity

[0021] Opacity according to the invention is the opacity as defined in norm NF Q03-006, expressed in percent.

[0022] Barrier property characterization of one side to be waxed of the paper substrate

[0023] In order to characterize the barrier property of one side, which is intended to be waxed, of the paper substrate, the Cobb test according to the Rizinus Cobb method can be performed, and the opacity on this side before and after the Cobb test according to the Rizinus Cobb method can be measured, as detailed below.

Cobb test according to the Rizinus Cobb method

[0024] This test is adapted from the standard SCAN -P 37:77 which specifies the procedure for determining the oil absorbency of paper or board.

[0025] Castor oil is applied at ambient temperature (20°C) on one side to be waxed of the paper substrate according to the Rizinus Cobb method, which consists of the following:

The reservoir of the absorbency testing device SFT 03t model from IGT Testing Systems is filled with castor oil. The castor oil is characterized by a density comprised between 0.95 g/cm^3 and 0.97 g/cm^3, a saponification value comprised between 170 and 190 and an iodine value comprised between 80.0 and 95.0.

[0026] The paper substrate is placed on the castor oil reservoir, the side of the paper substrate to be tested being orientated downward, in other words towards the oil. The reservoir is closed and maintain with a lid.

[0027] The reservoir with the paper substrate is returned manually upside down, so that the castor oil is in contact with the paper substrate.

[0028] After two minutes, the paper substrate and the castor oil reservoir are returned to their initial position: the paper substrate is on the castor oil reservoir. The lid is unblocked but kept in place to maintain the paper substrate on the reservoir. The excess of castor oil on the paper substrate is removed by pulling the paper on the edge of the reservoir.

[0029] Difference of opacity before and after Cobb test according to the Rizinus Cobb method

[0030] The opacity is measured on the paper substrate before and after the Cobb test according to the Rizinus Cobb method on one side to be waxed.

[0031] The difference of opacity of the paper substrate before and after the Cobb test according to the Rizinus Cobb method is calculated as followed:

$$\text{Difference of opacity (\%)} = \text{Opacity before Cobb test (\%)} - \text{Opacity after Cobb test (\%)}$$

[0032] The difference of opacity of the paper substrate before and after the Cobb test according to the Rizinus Cobb method on one side to be waxed of the paper substrate is related to the barrier property of this side of the paper substrate: the lowest this difference of opacity, the strongest the barrier against wax of this side of the paper substrate.

[0033] The difference of opacity of less than or equal to 8% of the paper substrate before and after the Cobb test according to the Rizinus Cobb method on one side to be waxed may be fulfilled regardless of the side of the paper substrate chosen for the application of the castor oil.

Paper substrate

[0034] The paper substrate may have a basis weight of less than or equal to 60 g/m^2, preferably less than or equal to 45 g/m^2, notably less than or equal to 40 g/m^2 following the standard NF EN ISO 536.

[0035] The paper substrate is preferably a printable paper substrate.

[0036] The paper substrate may have a surface energy higher than or equal to 25 J/m^2 and preferably higher than or equal to 30 J/m^2.

[0037] The paper substrate may be calendered.

[0038] The Bekk smoothness according to ISO 5627:1995 on one side of the paper substrate may range between 1300 s and 2500 s.

Fibrous base

[0039] The paper substrate comprises a fibrous base.

[0040] The fibrous base may have of origin wood pulp, non-wood fibers, natural pulp, synthetic fibers, semi synthetic fibers or a mix of any of them.

[0041] The paper may comprise hardwood fibres and softwood fibres, for example between 60 and 70% of softwood fibres and between 30 and 40% of hardwood fibres.

Opacifying additive

[0042] The paper substrate comprises at least one opacifying additive.

[0043] The at least one opacifying additive may comprise a pigment, the pigment preferably having a high refractive index, in particular higher than or equal to 2,30.

[0044] The at least one opacifying additive comprise preferably TiO_2 or zinc sulfide, most preferably TiO_2.

[0045] TiO_2 may be anatase titanium dioxide or rutile titanium dioxide, preferably rutile titanium dioxide.

Binder

[0046] The paper substrate comprises at least one binder, for example only one or a mixture of different binders.

[0047] The at least one binder is preferably located near the surface of the paper substrate.

[0048] According to a first embodiment of the invention, the at least one binder is a water soluble binder.

[0049] The at least one water soluble binder may be selected from PVOH or starch, preferably from PVOH.

[0050] The paper substrate may comprise PVOH and starch

[0051] According to a second embodiment of the invention, the at least one binder is a water insoluble binder.

[0052] The at least one water insoluble binder may be selected from latex made from polymers and copolymers from several monomers, notably styrene, butadiene, acrylic esters, vinyl acetate, and acrylonitrile.

[0053] The paper substrate may comprise latex made from polymers and copolymers from several monomers, notably styrene, butadiene, acrylic esters, vinyl acetate, and acrylonitrile.

[0054] In another embodiment of the invention, the paper substrate may comprise a mixture of water soluble and water insoluble binders.

[0055] The paper substrate may comprise binder(s) between 1 to 20%, preferably 1 to 10 %, in dry weight relative to dry weight of paper substrate. It may represent 40 to 90 % in dry weight of binder(s) in the surface coating composition containing said binder(s).

Softening agent

[0056] The paper substrate may comprise at least one softening agent.

[0057] The one or more softening agent are useful to maintain high moisture content associated with flexibility to enhance twisting without breaks nor tears during packaging after waxing.

[0058] The at least one softening agent preferably penetrates to the core of the paper substrate.

[0059] The at least one softening agent may be selected from, but not limited to, urea, nitrate, notably sodium nitrate, a mixture of urea and sodium nitrate, or an organic plasticizer such as sorbitol, sorbitol ether, polyethylene glycol or glycerol, the at least one softening agent being preferably a mixture of urea and sodium nitrate.

[0060] The paper substrate may comprise two or more softening agents, preferably selected from urea, nitrate, notably sodium nitrate, a mixture of urea and sodium nitrate, or an organic plasticizer such as sorbitol, sorbitol ether, polyethylene glycol or glycerol.

[0061] The paper substrate may comprise softening agent(s) in an amount between 0,2 to 15%, preferably 0,5 to 5 %, in dry weight relative to dry weight of paper substrate. It may represent 10 to 50 % in dry weight of softening agent(s) in the surface coating composition containing said softening agent(s).

Other additives

[0062] The paper substrate may comprise at least one additional additive.

[0063] The at least one additional additive may be a rheology modifier, preferably a carboxymethyl cellulose.

[0064] The at least one additional additive may be an insolubilizing agent.

[0065] The paper substrate may comprise both rheology modifier and insolubilizing agent.

Addition to the fibrous base

[0066] The at least one binder may be applied on at least one side to be waxed, preferably on both sides to be waxed, of a paper web comprising the fibrous base, preferably using a metered size press.

[0067] The at least one binder may be applied on at least one side to be waxed, preferably on both sides to be waxed, of a paper web comprising the fibrous base, using a size press.

[0068] The at least one opacifying additive may be mixed to the fibrous base before formation of the paper web.

[0069] The at least one softening agent may be applied on at least one side to be waxed, preferably on both sides to be waxed, of the paper web, preferably using a metered size press.

[0070] The at least one softening agent may be applied on at least one side to be waxed, preferably on both sides to be waxed, of the paper web, using a size press.

[0071] The at least one softening agent and the at least one binder may be applied on at least one side to be waxed, preferably on both sides to be waxed, of the paper web at the same step or at different steps, preferably at the same step.

[0072] Although the at least one softening agent and the at least one binder may have different properties, the softening agent penetrating to the core of the paper substrate and the binder remaining near the surface of the paper substrate, it has been surprisingly found that it is possible to apply them on at least one side to be waxed, preferably on both sides to be waxed, of the paper web at the same step.

[0073] The size press or the metered size press enables in particular to apply the at least one binder and/or the at least one softening agent on one or both sides to be waxed of the paper web at high speed.

Twisting paper substrate

[0074] The paper substrate is a twisting paper substrate.

[0075] A twisting paper substrate according to the invention is a paper substrate having a cross-direction (CD) elongation according to ISO 1924 higher than or equal to 7.5%, a machine direction (MD) tear resistance according to ISO 1974 higher than or equal to 200 mN, a CD tear resistance higher than or equal to 220 mN and a stiffness according to ISO 2493 (15° 5 mm) not higher than or equal to 40 mN in the MD and not higher than or equal to 20 mN in the CD.

[0076] The twisting paper substrate according to the invention has suitable deformation and resistance capacity for absorbing torsion energy during packaging without being torn. This can be described as paper twistability.

[0077] Twisting paper substrates according to the invention are able to match compromise between barrier and twistability. Barrier properties against wax are notably brought by the at least one binder and twistability is notably brought by the at least one softening agent.

[0078] Known twisting papers can give good twistability due to high flexibility and special surface treatments but wax penetration is out of control due to broadly opened surface.

Application

[0079] The paper substrate may be used for confectionary applications, notably sweets twisting application.

Wax

[0080] The wax may be a hydrocarbon wax. It may be extracted and refined from petroleum, resulting in for example paraffin, or derived from gas synthesis, resulting in a synthetic wax.

[0081] The wax may be a vegetable wax. It may be fatty and derivated from palm oil, soy oil and rapeseed.

Waxed paper wrapping

[0082] The production of the waxed paper wrapping comprises the production of the paper substrate according to the invention and the application of wax on at least one side, preferably on both sides, of the paper substrate.

[0083] Therefore, the waxed paper wrapping comprises the paper substrate according to the invention and a coating of wax on at least one side of the paper substrate.

[0084] The paper substrate may be remoistered, notably with a blend comprising water, glycerol and sorbitol, before wax application

[0085] Wax may be present on at least one side of the paper substrate, forming one layer on the application side of the paper substrate and penetrating at least partially in the fibrous base.

[0086] Wax may be present on both sides of the paper substrate, forming one layer on each side of the paper substrate and penetrating at least partially in the fibrous base.

[0087] At least one side of the paper substrate may be printed before application of wax. Thus, the waxed paper wrapping may comprise at least one printed mark on the paper substrate and under the wax layer.

[0088] The wax quantity in the fibrous base may be less than or equal to 7 g/m^2, preferably less than or equal to 5 g/m^2, preferably less than or equal to 4 g/m^2 when the wax is applied on both sides of the paper substrate.

[0089] The wax quantity in the fibrous base may be less than or equal to 4 g/m^2, preferably less than or equal to 3 g/m^2, better to 2.5 g/m^2, even better to 2.0 g/m^2 and even better to 1.5 g/m^2, when the wax is applied on one side of the paper substrate.

[0090] Such a low wax quantity enables to give relevant cost advantages, environmental advantages with easier compostability, and more stable processes.

[0091] The difference of opacity between the paper substrate, before application of wax, and the waxed paper wrapping

may be less than or equal to 10%, preferably less than or equal to 5%, notably less than or equal to 3%

[0092] Opacity is measured in an unprinted area of the waxed paper wrapping.

Packaged food product

[0093] The packaged food product comprises a food product and a waxed paper wrapping according to the invention, twisted around the food product.

[0094] The waxed paper wrapping may be twisted in at least one turn around the food product

The food product may be a confectionary food product, such as a sweet.

Examples

Paper substrates:

[0095] The fibrous base is a standard fibrous base used for confectionery application which main characteristics are presented in table 1.

Table 1- Fibrous base characterization

				Fibrousbase	
			Standard	AVG	SD
Basisweight		g/m^2	ISO 536-1995 E	40,4	0,1
Tear	MD	mN	ISO 1974-1990 E	302	10
Tear	CD	mN		298	11
Stiffness (15° - 5 mm)	MD	mN	ISO 2493-1 : 2010 ISO 5628-1990 E	41,1	6,2
Stiffness (15° - 5 mm)	CD	mN		20,1	2,5
Breaking length	MD	Km	ISO 1924-2-1994	6,81	0,53
Breaking length	CD	Km		2,42	0,30
Elongation	MD	%	NF EN ISO 1924-2-1994	3,7	0,1
Elongation	CD	%		9,6	0,7

[0096] Two different surface treatments have been tested, applied each time on both sides of the paper substrate:

- A surface coating recipe according to the invention, SP-1.
- A surface coating recipe corresponding to a standard recipe SP-2.

[0097] Table 2 presents details of both recipes.

Table 2- coating recipes characterization.

	Recipe	SP-1	SP-2
In composition of the surface layer (in % by dry weight)	Urea	30,73	79,9
	Nitrate	5,27	13,7
	Starch *	2,46	6,4
	PVOH **	46, 73	
	Carboxymethylcellulose***	10,96	
	Insolubilizing agent ****	3,85	

(continued)

	Recipe	SP-1	SP-2
Solid content target (%)		8%	8%
Solid content measured (%)		8,22%	8,30%
Viscosity (mPa/s)		92	13
T°C		25	23
pH		7,79	7,85
* Perfectafilm A115 from Avebe ** Celvol 325 from Sekisui Chemical Co, Ltd *** DP 100N from Lamberti **** Cartabond TSI from Archroma Managment GmbH			

[0098] A size press has been used to apply the surface treatments on the fibrous bases. The conditions were the following: 2 presses at 25 PJ hardness and 4 bars pressure in the nip. Speed was 40 m/min with oven set at 140°C.

[0099] Coatweight is about 2 g/m^2 total dry weight on both sides of each fibrous base.

[0100] In this way, two paper substrates have been produced, each comprising a fibrous base and a surface coating (SP-1 or SP-2).

Paper substrates characterization:

[0101] Table 3 presents the main paper characteristics of these two paper substrates.

[0102] Both paper substrates are twisting paper substrate according to the invention (see table 3 tear, elongation and stiffness values).

[0103] SP coating according to the invention (SP-1) can provide high barrier property to paper while SP-2 is not giving the expected barrier level (see delta opacity after rizinus cobb values of table 3)

				Fibrous base			
				SP-1		SP-2	
			Standards	AVG	SD	AVG	SD
Basis weight		g/m²	ISO 536-1995 (E)	42,42	0,21	41,41	1,09
Bekk Smoothness	Front Side	sec	ISO 5627: 1995	2421	175	2130,17	144
Bekk Smoothness	Reverse Side	sec		149,00	5,79	146,20	15,45
Elongation	CD	%	NF EN ISO 1924 - 2 - 1994	10,48	0,86	9,82	0,59
Tear	MD	mN	ISO 1974-1990 (E)	227,40	10,94	269,70	3,79
Tear	CD	mN		232,00	3,74	271,70	13,28
Stiffness (15° - 5 mm)	MD	mN	ISO 2493-1: 2010	36,20	4,08	29,60	1,71
Stiffness (15° - 5 mm)	CD	mN		19,60	1,84	17,20	1,23
Delta opacity after rizinus cobb	Front Side	%	According to the specification	3,30	1,55	14,40	1,20
Delta opacity after rizinus cobb	Reverse Side	%	According to the specification	3,50	1,99	13,20	0,01

Table 3 – Paper substrates characteristics

Waxed paper wrappings

[0104] The paper substrates_have been remoistered with a blend Water/ Glycerol/ Sorbitol and waxed on both sides with paraffin wax heated at 105 -110°C.

[0105] The quantity of wax that is applied ranges between 7 and 8,5 g/m^2 in dry weight.

[0106] Table 4 presents wax coatweights measured inside papers. SP-1 is showing a wax saving of 33% compared to SP-2.

[0107] The amount of TiO_2 present in the paper substrate was the same in both cases, and equal to 3.5% of the weight of paper substrate but the difference of opacity before and after waxing is much lower with SP-1 coating, which is a different way to prove lower wax penetration thanks to wax barrier provided by SP-1 coating.

			Fibrous base	
		Standards	SP-1	SP-2
Wax coatweights inside paper	(g/m²)		5,05	7,55
Wax saving inside vs. SP-2	(%)		33,11%	
Opacity before waxing	(%)	NFQ 03-006	63,55	65,32
Opacity after waxing (Measured on waxed samples)	(%)	NFQ 03-006	59,49	53,2
Delta opacity after waxing	(%)		4,06	12,12

Table 4 - Wax saving

[0108] Therefore coating SP-1 is able to provide suitable barrier to save quantity of wax applied on twisting paper substrates according to the invention.

[0109] Because of this wax saving, less opacifying additive needs to be added in the paper substrate to achieve a given level of opacity of the waxed paper wrapping, which reduces costs.

Claims

1. A twisting paper substrate to be waxed for the production of an opaque waxed paper wrapping, wherein the paper substrate comprises a fibrous base, at least one opacifying additive and at least one binder reducing penetration of wax in the fibrous base during the production of the waxed paper substrate by application of wax on the paper substrate, wherein the difference of opacity of the paper substrate before and after the Cobb test according to the Rizinus Cobb method on one side to be waxed of the paper substrate is less than or equal to 8 percent.

2. The paper substrate according to claim 1, wherein said difference of opacity is less than or equal to 5 percent.

3. The paper substrate according to claim 1 or 2, wherein said difference of opacity is fulfilled regardless of the side of the paper substrate chosen for the application of the castor oil.

4. The paper substrate according to any preceding claim, wherein the at least one opacifying additive comprises TiO_2 or zinc sulfide, preferably TiO_2.

5. The paper substrate according to any preceding claim, wherein the at least one binder is a water soluble binder, wherein the at least one water soluble binder is preferably selected from PVOH or starch, more preferably from PVOH.

6. The paper substrate according to any one of claims 1 to 4, wherein the at least one binder is a water insoluble binder, wherein the at least one water insoluble binder is preferably selected from latex made from polymers and copolymers from several monomers, notably styrene, butadiene, acrylic esters, vinyl acetate, and acrylonitrile.

7. The paper substrate according to any preceding claim, wherein the paper substrate comprises at least one softening agent, wherein the at least one softening agent is preferably selected from urea, nitrate, notably sodium nitrate, a mixture of urea and sodium nitrate, or an organic plasticizer such as sorbitol, sorbitol ether, polyethylene glycol or glycerol, the at least one softening agent being more preferably a mixture of urea and sodium nitrate.

8. The paper substrate according to any preceding claim, having a basis weight of less than or equal to 60 g/m^2, preferably less than or equal to 45 g/m^2, notably less than or equal to 40 g/m^2 according to the standard ISO 536.

9. The paper substrate according to any preceding claim, having a surface energy higher than or equal to 25 J/m^2 and preferably higher than or equal to 30 J/m^2.

10. A waxed paper wrapping, comprising the paper substrate according to any one of claims 1 to 9 and a coating of wax on at least one side of the paper substrate.

11. The waxed paper wrapping according to claim 10, wherein the wax is present on at least one side, preferably on both sides, of the paper substrate, the wax forming one layer on each of the application side(s) of the paper substrate and penetrating at least partially in the fibrous base.

12. The waxed paper wrapping according to claims 10 or 11, wherein the difference of opacity between the paper substrate, before application of wax, and the waxed paper wrapping is less than or equal to 10%, preferably less than or equal to 5%, notably less than or equal to 3%.

13. A method for producing a twisting paper substrate to be waxed for the production of an opaque waxed paper wrapping in particular as defined in any one of the claims 1 to 9, wherein the paper substrate comprises a fibrous base, at least one opacifying additive and at least one binder reducing penetration of wax in the fibrous base during the production of the waxed paper substrate by application of wax on the paper substrate, wherein the binder is applied on at least one side to be waxed of a paper web comprising the fibrous base.

14. A method for producing the paper substrate according to any one of claims 1 to 9, wherein the at least one binder is applied on at least one side to be waxed, preferably on both sides to be waxed, of a paper web comprising the fibrous base, preferably using a metered size press.

15. The method according to claim 13 or 14, the at least one opacifying additive being mixed to the fibrous base before formation of the paper web.

16. A method for producing a waxed paper wrapping according to any one of claims 10 to 12, comprising the production of the paper substrate according to any one of claims 1 to 9 and application of the wax on the paper substrate.

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EUROPEAN SEARCH REPORT

Application Number
EP 14 30 5656

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Y	* example 8 *	1-16	
X	US 6 740 373 B1 (SWOBODA DEAN P [US] ET AL) 25 May 2004 (2004-05-25)	1,4,5, 10,16	
Y	* claims 1,33,34 * * column 23, line 1 - line 9 *	1-16	
X	US 2013/284388 A1 (BALLINGER THOMAS W [US]) 31 October 2013 (2013-10-31) * claims 1,10,11 *	1	
X	US 2008/081175 A1 (MUKKAMALA RAVI [US]) 3 April 2008 (2008-04-03) * paragraph [0075] - paragraph [0077] *	1	
X	WO 96/15321 A1 (PETERSON SEFFLE AKTIEBOLAG [SE]; AAKERBLOM INGA STINA [SE]; STOLPE LEN) 23 May 1996 (1996-05-23)	1,6	TECHNICAL FIELDS SEARCHED (IPC)
Y	* claims 1-20 *	1-16	D21H B65D
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Y	* claims 1-38 *	1-16	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	6 October 2014	Ponsaud, Philippe

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 14 30 5656

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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06-10-2014

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