(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 949 225 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
02.12.2015 Bulletin 2015/49

(51) Int Cl.:
A24D 3/04 *(2006.01)* ***A24D 1/02*** *(2006.01)*

(21) Application number: **14001848.2**

(22) Date of filing: **27.05.2014**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(71) Applicant: **Reemtsma Cigarettenfabriken GmbH**
22761 Hamburg (DE)

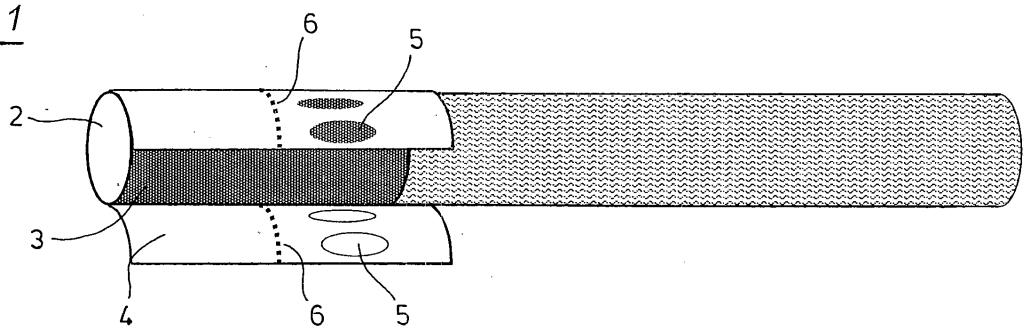
(72) Inventors:
- **Pienemann, Thomas**
  22761 Hamburg (DE)
- **Fuhrmann, Jan**
  22761 Hamburg (DE)
- **Hühne, Thomas**
  22761 Hamburg (DE)

(74) Representative: **UEXKÜLL & STOLBERG Patentanwälte**
Beselerstrasse 4
22607 Hamburg (DE)

(54) **Smoking article**

(57) A smoking article comprises a wrapped tobacco rod (1) and a filter comprising filter material (2) and an outer plug wrap (3). The wrapped tobacco rod (1) and the filter (2, 3) are connected by a tipping paper (4) which overwraps the filter (2, 3) and a part of the wrapped tobacco rod (1). The outer plug wrap (3) is opaque and comprises activated carbon. The tipping paper (4) is provided with at least one opening (5) which exposes the surface of the outer plug wrap (3).

Fig. 1



EP 2 949 225 A1

Description

[0001] The invention relates to a smoking article, e.g., a filter cigarette.

[0002] It is commonly known that smoking can cause smelly fingers. During the smouldering phase of a cigarette, sidestream smoke is emitted from the burning end. Depending on the angle in which the cigarette is held, a portion of this sidestream smoke flows alongside the cigarette and gets into contact with a smoker's fingers. Smelly components of the sidestream smoke can deposit on the skin, causing a long-lasting, unpleasant finger smell. Use of charcoal materials (activated carbon) in cigarette papers and filters is a widely applied technology to reduce the levels of volatile smoke constituents.

[0003] WO 2008/043988 A1 discloses a carbon-containing paper used as a filter plug wrap. The core of the related filter comprises carbon as well. A filter according to this document would be connected to a cigarette rod using a conventional tipping paper so that the carbon paper is not directly exposed to the outer surface of the cigarette.

[0004] EP 2 719 295 A1 describes a smoking article with a filter wrapper containing at its inner surface a sorption material to reduce mainstream gas phase constituents. It is characterised by having a ventilation zone located upstream of at least 80% of the sorbent material to maximize the desired effect of reducing smoke constituents.

[0005] US 3 370 592 discloses a filter cigarette with parts of the filter being made visible by use of a transparent plug wrap in combination with a tipping comprising openings for viewing. The purpose of this design is to indicate the adsorption in the filter, e.g. by colour change. Similar solutions are described in CH 394 912, WO 2011/154246 A1, WO 2012/076649 A1, and EP 1 252 832 A2.

[0006] WO 2011/038430 A1 discloses a method of producing tipping papers or filter plug wraps with viewing holes.

[0007] The object of the invention is to provide a smoking article which can reduce finger smell generally caused by smoking.

[0008] This object is achieved by a smoking article having the features of claim 1. Advantageous versions of the invention follow from the dependent claims.

[0009] The smoking article (e.g., a cigarette) according to the invention comprises a wrapped tobacco rod and a filter. The filter includes filter material and an outer plug wrap. The wrapped tobacco rod and the filter are connected by a tipping paper which overwraps the filter and a part of the wrapped tobacco rod. The outer plug wrap is opaque and comprises activated carbon (active charcoal). The tipping paper is provided with at least one opening (in the following: "openings", which does not exclude just one opening, however) through which the carbon surface of the outer plug wrap is exposed, i.e. exposed to the outside of the smoking article.

[0010] The filter may be composed of one segment, which comprises filter material (e.g., cellulose acetate) and is wrapped with the outer plug wrap. In this sense, the term "outer plug wrap" includes a single filter plug wrap as commonly used in mono-filters. It is conceivable, however, that one or more than one additional layers of wrapping material are provided beneath the outer plug wrap. In any case, the outer plug wrap comprising activated carbon is the outermost layer of the filter segment.

[0011] In other embodiments, the filter includes more than one segment, each segment comprising an outer layer. In this case the individual segments are connected to each other by the outer plug wrap, which overwraps the outer layers of the individual segments. For example, the filter may comprise at least one segment containing an adsorbent, preferably activated carbon. In an embodiment of this type of filter, the filter comprises a mouth-sided segment containing cellulose acetate and a rod-sided segment containing grains of activated carbon, and both segments are overwrapped and connected with the outer plug wrap, which includes activated carbon as well. As before, it is conceivable that an individual segment is wrapped with more than one layer, e.g. with layers of different materials, or that an additional common plug wrap is provided beneath the activated carbon-containing outer plug wrap.

[0012] The tobacco rod of the smoking article can be wrapped with a suitable cigarette paper, as well known in the art. The wrapped tobacco rod and the filter are coaxially aligned and linked by wrapping with the tipping paper. As such, the tipping paper is always the outermost layer in the filter region of the smoking article.

[0013] In advantageous embodiments, the outer plug wrap consists of a single ply containing activated carbon. The term "single ply" does not exclude an optional additional coating, but means that there is only one paper ply. The activated carbon can be added, e.g., during the paper manufacturing process. Suitable papers are disclosed in WO 2008/043988 A1 (see above) and are commercially available, e.g., from Saber Swiss Quality Paper. They are commonly referred to as "carbon papers". The activated carbon can also be applied to the outer surface of a conventional plug wrap paper after paper making by suitable methods such as coating or printing.

[0014] The tipping, although designated as "tipping paper", can be made from any suitable material known to a skilled person, e.g. paper, cellophane, polymer films etc. In this sense, the term "paper" includes the other materials as well. The tipping paper comprises one or more openings of any suitable shape. Preferentially, each opening has a surface area in the range of from 0.5 mm^2 to 20 mm^2. The combined surface area of all openings at one cigarette can be in the range of from 20 mm^2 to 200 mm^2. Preferably, these openings are located in the region of the filter where the cigarette is usually held, which is 10 mm or more away from the mouth-sided end of the cigarette. In case of filter-ventilated

cigarettes, the openings should be placed upstream of the ventilation zone. The openings can be cut from the tipping paper by well-known processes such as laser-cutting or mechanical punching-out.

[0015] In the smoking article according to the invention, the activated carbon is exposed through the openings to the outer surface of the filter end of the smoking article, where the smoking article is usually held, so that the activated carbon is placed in close proximity to the smoker's fingers during use of the smoking article. The activated carbon can interact with the sidestream smoke that passes along the cigarette surface and can adsorb smelly sidestream smoke constituents. A further way of interaction is by direct contact between the activated carbon and the fingers, whereby smelly, volatile substances that already have been deposited on the skin can be adsorbed by the activated carbon.

[0016] To avoid additional filter ventilation caused by the openings, the filter may comprise at least one layer of wrapping (including the carbon-containing outer plug wrap) which has, in the area of the openings, a porosity of less than 10 CU. That means, one of the filter plug wraps lying beneath the openings is substantially unporous, i.e. it has a porosity of less than 10 CU. CU: Coresta Unit. 1 CU = 1 $cm^3/(cm^2 \cdot min \cdot kPa)$. This largely unporous plug wrap may be, e.g., the carbon-containing outer plug wrap itself in case of a mono filter or at least one of the inner filter plug wrappings in case of a filter including more than one segment. Typical porosity values for porous wrappings are in the range of from 100 CU to 40000 CU.

[0017] To achieve the required level of filter ventilation, the tipping paper can be additionally micro-perforated, e.g. by electro-perforation or laser perforation, either before or after it is wrapped about the smoking article. In the latter case, the perforations would also extend through any low-porosity wrapping beneath the tipping paper. Preferably, this additional ventilation zone is located downstream to the openings in the tipping paper. In consequence, the ventilation zone may be arranged in an area extending from the mouth-sided end of the smoking article to 70% of the length of the outer plug wrap. The length of the outer plug wrap preferably corresponds to the filter length.

[0018] Preferably, the openings are located at a distance of at least 10 mm from the mouth-sided end of the smoking article. This generally avoids a contact of the user's lips with the activated carbon exposed through the openings, but is a good distance in order to achieve a finger smell reduction.

[0019] In advantageous embodiments of the invention, the content of activated carbon in the outer plug wrap is in the range of from 5% to 50% (by weight, i.e. total weight of the outer plug wrap including activated carbon) or, preferably, in the range of from of 10% to 30% (by weight).

[0020] As already mentioned, the activated carbon may be applied to the outwardly directed surface of the outer plug wrap, i.e. to that surface of the outer plug wrap which is outwardly directed with respect to the finished smoking article and exposed through the openings in the tipping paper. The step of application can be performed, e.g., by coating or printing, preferably after the paper making process and before the outer plug wrap is wrapped about the corresponding filter parts.

[0021] Typically, the outer plug wrap has an areal weight in the range of from 20 g/m^2 to 80 g/m^2, which includes the activated carbon.

[0022] In advantageous embodiments of the invention, the tobacco rod is wrapped with a low-sidestream ("LSS") cigarette paper (or with multiple layers of a cigarette paper, which also has a sidestream-reducing effect). LSS cigarette papers are commercially available, e.g. from Delfort Group, and usually contain higher $CaCO_3$ filler levels or special fillers like MgO. By using an LSS cigarette paper, a lower amount of sidestream smoke is released from the smoking article during smouldering, which adds to the effect of the exposed outer plug wrap containing activated carbon with respect to a reduction of finger smell.

[0023] As already mentioned further above, the filter may generally comprise one filter segment or more than one filter segment. In advantageous embodiments, at least one filter segment contains an adsorbent, preferably activated carbon. In addition to reducing gas phase constituents of the mainstream smoke, the adsorbent can also reduce the smell of discarded cigarette butts. Adsorbent may be added to filter materials (e.g., if only one filter segment is present) and/or contained in a separate filter compartment, as generally known in the art.

[0024] In addition to or instead of activated carbon, it is also conceivable that the outer plug wrap contains at least one adsorbent different from activated carbon. Examples for such adsorbents are zeolites, alumina or silica.

[0025] In further embodiments of the invention, the filter of the smoking article has particular design features such as a coloured tow (e.g., coloured cellulose acetate tow), a mouth-sided recess or a shaped hollow bore element at the mouth-sided end of the filter, as known in the art.

[0026] In the following, the invention is explained in more detail by means of embodiments and examples. The drawings show in

Figure 1 a schematic three-dimensional view of an embodiment of the smoking article according to the invention, in which part of a tipping paper connecting a wrapped tobacco rod to a filter is shown unwrapped, and

Figure 2 schematic views of examples for patterns of openings provided in the tipping paper.

[0027] Figure 1 illustrates, in a three-dimensional view, a cigarette as an example of a smoking article. The cigarette comprises a wrapped tobacco rod 1, which includes an amount of a tobacco blend wrapped in a cigarette paper, and a filter. The filter comprises filter material 2, e.g. cellulose acetate, which is wrapped in a plug wrap 3 (corresponding to the outer plug wrap discussed above) containing activated carbon. The filter is connected to the wrapped tobacco rod 1 by a tipping paper 4, which comprises openings 5 and an optional perforation line 6 for filter ventilation. The tipping paper 4 overwraps the filter 2, 3 and a part of the wrapped tobacco rod 1. For illustration purposes, the tipping paper 4 is shown partially unwrapped. Generally, the filter can be designed as a filter having one segment or more than one segment, as explained above.

[0028] Figure 2 is a schematic drawing that shows several examples of patterns and shapes for openings 5' provided in tipping paper 4'. It is evident that there are much more possibilities for arrangements of openings 5'.

Example 1

[0029] Cigarettes with a mono filter according to the following specifications were produced on a standard cigarette maker:

Cigarette circumference:	24.5 mm
Cigarette length:	83 mm
Tobacco rod length:	56 mm
Rod weight:	620 mg
Cigarette paper:	LSS paper, 10 CU, 45 g/m^2
Filter length:	27 mm
Filter material:	Cellulose acetate 3.8Y30
Filter plug wrap:	Paper of 40 g/m^2
	10% activated carbon by weight
	Porosity < 10 CU
Tipping length:	32 mm (on cigarette)

[0030] The tipping was made from white paper and had oval openings of 2.5 mm x 8 mm with a distance of 2.4 mm, similar to the first example of Fig. 2. The distance of the downstream edge of the openings to the mouth-sided end of the cigarette was 16 mm.

[0031] A filter ventilation of 35% was applied by use of an on-line laser on the cigarette machine with the laser line being located at 13 mm from the mouth-sided end.

Example 2

[0032] Cigarettes with a dual filter according to the following specifications were produced on a standard cigarette maker:

Cigarette circumference:	24.5 mm
Cigarette length:	83 mm
Tobacco rod length:	56 mm
Rod weight:	620 mg
Cigarette paper:	LSS paper, 10 CU, 45 g/m^2
Filter length:	27 mm
Mouth-ended filter plug:	
Filter material:	Cellulose acetate 3.8Y30
Plug wrap:	Paper of 23 g/m^2
Plug wrap porosity:	10000 CU
Plug length:	15 mm
Rod-ended filter plug:	
Filter material:	Cellulose acetate 3.8Y30
	with 3 mg/mm activated carbon
Plug wrap:	Paper of 27 g/m^2

(continued)

Plug wrap porosity:	< 10 CU
Plug length:	12 mm
Outer plug wrap:	Paper of 50 g/m^2
	30% activated carbon content by weight
	Porosity 1200 CU
Tipping length:	32 mm (on cigarette)

[0033] The tipping was made from white paper and had oval openings of 2.5 x 6 mm with a distance of 2.4 mm, similar to the first example of Fig. 2. The distance of the downstream edge of the openings to the mouth-sided end of the cigarette was 17 mm. The tipping had an additional electrostatic micro-perforation located between 10 and 13 mm distance from the mouth-sided end to obtain a tipping porosity (measured excluding openings) of 300 CU. By choice of these parameters, a filter ventilation of 25% was achieved.

[0034] Cigarettes according to both Example 1 and Example 2 were smoked by a test panel over a period of one week, and the participants reported that less finger smell was observed compared to their usual brand.

Claims

1. Smoking article, comprising a wrapped tobacco rod (1) and a filter which comprises filter material (2) and an outer plug wrap (3), the wrapped tobacco rod (1) and the filter (2, 3) being connected by a tipping paper (4) which overwraps the filter (2, 3) and a part of the wrapped tobacco rod (1), **characterised in that** the outer plug wrap (3) is opaque and comprises activated carbon and **in that** the tipping paper (4) is provided with at least one opening (5) which exposes the surface of the outer plug wrap (3).

2. Smoking article according to claim 1, **characterised in that** the filter (2, 3) is composed of one segment, which comprises filter material (2) and is wrapped with the outer plug wrap (3).

3. Smoking article according to claim 1, **characterised in that** the filter includes more than one segment, each segment comprising an outer layer, wherein the individual segments are connected to each other by the outer plug wrap which overwraps the outer layers of the individual segments.

4. Smoking article according to claim 2 or 3, **characterised in that** the filter comprises at least one segment containing an adsorbent, preferably activated carbon.

5. Smoking article according to any one of claims 1 to 4, **characterised in that** the filter comprises at least one layer of wrapping, including the outer plug wrap (3), which has, in the area of the openings (5), a porosity of less than 10 CU.

6. Smoking article according to any one of claims 1 to 5, **characterised by** a micro-perforated ventilation zone (6), which is arranged in an area extending from the mouth-sided end of the smoking article to 70% of the length of the outer plug wrap.

7. Smoking article according to any one of claims 1 to 6, **characterised in that** the openings (5) are located at a distance of at least 10 mm from the mouth-sided end of the smoking article.

8. Smoking article according to any one of claims 1 to 7, **characterised in that** the individual openings (5) each have an area in the range of from 0.5 mm^2 to 20 mm^2.

9. Smoking article according to any one of claims 1 to 8, **characterised in that** the total area of the openings (5) is in the range of from 20 mm^2 to 200 mm^2.

10. Smoking article according to any one of claims 1 to 9, **characterised in that** the content of activated carbon in the outer plug wrap (3) is in the range of from 5% to 50%, by weight.

11. Smoking article according to claim 10, **characterised in that** the content of activated carbon in the outer plug wrap (3) is in the range of from 10% to 30%, by weight.

12. Smoking article according to any one of claims 1 to 11, **characterised in that** the activated carbon is applied to the outwardly directed surface of the outer plug wrap (3).

13. Smoking article according to any one of claims 1 to 12, **characterised in that** the outer plug wrap (3), including the activated carbon, has an areal weight in the range of from 20 g/m^2 to 80 g/m^2.

14. Smoking article according to any one of claims 1 to 13, **characterised in that** the tobacco rod (1) is wrapped with a low-sidestream cigarette paper or with multiple layers of a cigarette paper having a sidestream-reducing effect.

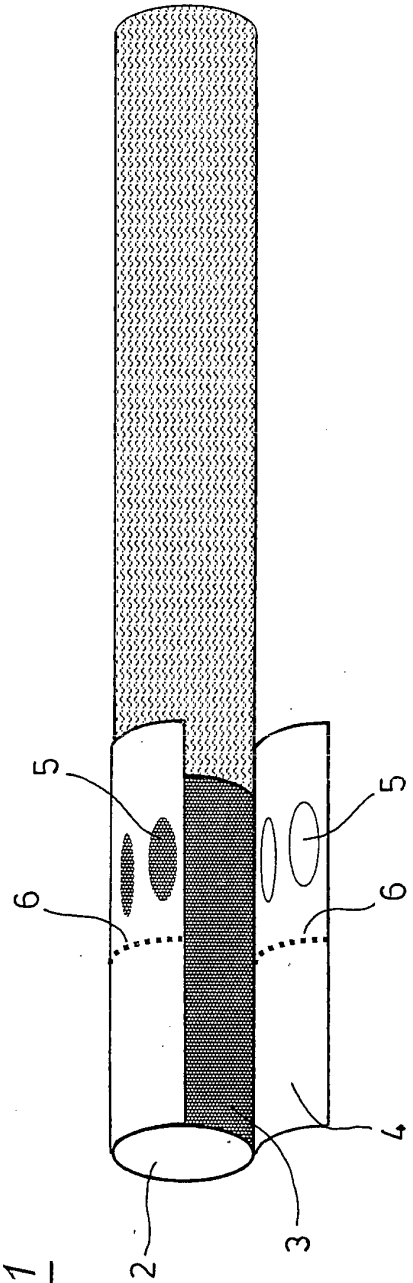


Fig. 1

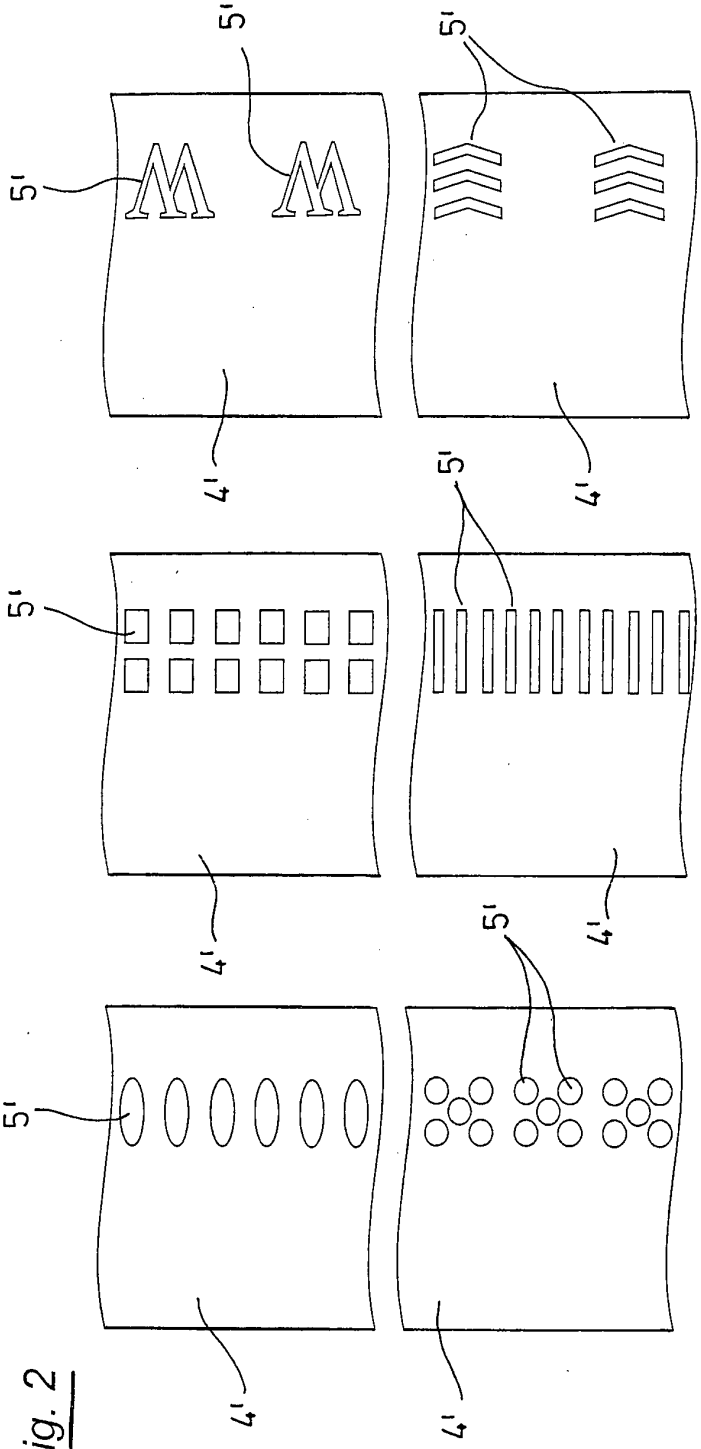


Fig. 2

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 14 00 1848

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X,D	EP 2 719 295 A1 (PHILIP MORRIS PROD [CH]) 16 April 2014 (2014-04-16) * paragraphs [0024], [0028], [0029], [0032], [0034] - [0039], [0047] - [0049]; figures *	1-4,6,7, 10-14	INV. A24D3/04 A24D1/02
X,D	WO 2011/038430 A1 (TANNPAPIER GMBH [AT]; GRIESMAYR GUENTER [AT]) 7 April 2011 (2011-04-07) * page 11, lines 10-22 * * page 12, line 19 - page 13, line 15; figure 9 *	1,2,6,8, 9,13	
A	WO 2014/012841 A2 (PHILIP MORRIS PROD [CH]) 23 January 2014 (2014-01-23) * page 14, line 19 - page 15, line 19; figures 1, 2 *	1,2,5,7, 8,12	
			TECHNICAL FIELDS SEARCHED (IPC)
			A24D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	3 December 2014	Novelli, Bruno

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 14 00 1848

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

03-12-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2719295 A1	16-04-2014	NONE	
WO 2011038430 A1	07-04-2011	AT 13169 U2	15-07-2013
		AT 13812 U1	15-09-2014
		AT 508818 A1	15-04-2011
		AU 2010302922 A1	24-05-2012
		CA 2779129 A1	07-04-2011
		CN 102711531 A	03-10-2012
		CO 6531425 A2	28-09-2012
		DK 2503910 T3	06-01-2014
		EA 201270472 A1	28-12-2012
		EP 2503910 A1	03-10-2012
		ES 2439668 T3	24-01-2014
		HK 1175374 A1	15-08-2014
		HR P20131198 T1	31-01-2014
		JP 5592492 B2	17-09-2014
		JP 2013505729 A	21-02-2013
		KR 20120095373 A	28-08-2012
		PT 2503910 E	24-12-2013
		SI 2503910 T1	31-01-2014
		US 2012240948 A1	27-09-2012
		WO 2011038430 A1	07-04-2011
WO 2014012841 A2	23-01-2014	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 2008043988 A1 **[0003] [0013]**
- EP 2719295 A1 **[0004]**
- US 3370592 A **[0005]**
- CH 394912 **[0005]**
- WO 2011154246 A1 **[0005]**
- WO 2012076649 A1 **[0005]**
- EP 1252832 A2 **[0005]**
- WO 2011038430 A1 **[0006]**