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(73) Proprietor: **IMPERIAL TOBACCO LIMITED**
Hartcliffe
Bristol, BS99 7UJ (GB)

(72) Inventor: **Drewett, Christopher George**
River View,
Mead Lane
Saltford,
Bristol (GB)
Inventor: **Chard, Brian Chester**
12 Ilchester Road
Bedminster Down,
Bristol (GB)
Inventor: **Herron, David**
52 Hampton Park
Redland,
Bristol (GB)
Inventor: **Luton, Colin Dennis**
6 Heath Ridge
Long Ashton,
Bristol (GB)

(74) Representative: **Marles, Alan David et al**
Stevens, Hewlett & Perkins
1 St. Augustine's Place
Bristol BS1 4UD (GB)

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Description

This invention concerns smoking articles such as cigarettes which use a wrapper normally comprising fibres of organic origin mixed with inorganic fillers and sometimes containing amounts of soluble chemical additives, binding agents and processing aids.

In the case of a cigarette a conventional wrapper would be predominantly comprised of wood and/or textile fibres mixed with inorganic filler such as calcium carbonate. These materials may be subject to a refining process and mixed in various proportions such that the wrapper properties can be widely varied to confer on the cigarette different characteristics such as smoulder rates, air permeability, ash quality, appearance and taste.

Cigarette paper technology has been developed sufficiently to establish relationships between paper parameters such as filler/fibre ratios and properties such as inherent permeability and opacity. These relationships are well known, as indeed are many of the relationships between paper properties and the performance of cigarettes constructed with these papers.

It is recognised that cigarette papers constructed in the conventional way are not homogeneous mixtures of fillers and fibre throughout their cross section. The distribution of the filler tends to change from one side to the other due to the nature of the wet draining process and filtration effect of the fibre. Hence conventional papers have normally a degree of asymmetrical fibre/filler mix which has a moderate but important effect on their performance especially in relation to ash formation.

By separately constructing papers with quite different properties, using for example pulps of different botanical origin and abnormally high and abnormally low filler contents, the product of their combination as a multi or double wrapper behaves quite differently from a single substantially homogeneous mix of the same components such as is achieved with conventional cigarette paper manufacture.

It has previously been proposed to use two substantially different wrappers on cigarette smoking articles. EP-A-0133575 discloses one such proposal.

US patent 3395714 describes the use of two thin sheets to form a composite wrapper wherein the outer sheet is a conventional cigarette paper and the inner sheet in contact with the tobacco is a heat insulating plastic film with a melting point below 440 °C. The specification also proposes manufacturing as two sheets or as a composite with two sheets glued together or by depositing the plastic film as a solution upon the sheet of cigarette paper. This patent proposes benefits for these systems which benefits include: changes in the low temperature distillation zone affecting smoke taste, reduced tobacco consumption between puffs and reduced emission of sidestream smoke.

US patent 3633589 proposes a composite wrapper composed of two thin sheets both consisting of vegetable fibre stock so as to provide the benefits claimed for US 3395714 without the disadvantages of plastic film.

US 3633589 provides no teaching as to the method by which the two thin sheets are linked but indicates that the composite wrapper is constructed out of independently manufactured papers described as conventional cigarette paper outer sheet and a calendered inner sheet which is practically impervious to air.

The present invention seeks to utilise the advantages of a multiple layer sheet whilst at the same time overcoming the practical difficulties of using double or multi sheet wrappers. Thus it is desired to have the benefit of combining the properties of different paper wrappers without the manufacturing difficulties associated with either laminating sheets in an off-line process or attempting to manufacture cigarettes with two paper wrappers run simultaneously on the cigarette making machine. Furthermore, it is desired to avoid the disadvantages of laminating adhesives.

It is therefore known, as far as Denmark is concerned, to provide a paper wrapper for smoking articles, which wrapper comprises two or more plies formed from discrete webs. According to the present invention the wrapper is formed while at least one of the webs is in the wet stage of formation whereby there is interaction of the fibres between adjoining plies such that the wrapper is in the form of a single sheet. Preferably each component ply has a basis weight of less than 20 g/m².

EP-A-0375844, which constitutes prior art in accordance with Article 54(3) EPC for all States except DK, discloses a paper wrapper for smoking articles, which wrapper comprises two or more plies formed from discrete webs while at least one of the webs is in the wet stage of formation whereby there is interaction of the fibres between adjoining plies such that the wrapper is in the form of a single sheet.

According to one aspect of the present invention each component ply has a basis weight of less than 20 g/m².

Preferably the webs are formed from different stock. (Stock being the ingredients of the headbox or reservoir).

Conveniently, said two or more webs are combined when all of the webs are in the wet stage of formation prior to drying.

In a preferred embodiment the wrapper is of low air permeability and preferably said permeability is 10 Coresta or less. In other preferred embodiments two partially formed webs are combined and one web is a substantially unfilled web having a low inherent permeability so as to prevent or substantially reduce staining or said one web contains activated carbon.

Further preferred features are that the other web is a filled web conferring a conventional appearance on the wrapper, for example the opacity of the wrapper is 60% or more. It may be that the filler of said other web comprises predetermined amounts of calcium carbonate (up to 50% by weight) or the filler of said other web comprises predetermined amounts of selected fillers, e.g. $\text{Mg}(\text{OH})_2$, Al_2O_3 , LiOH and high surface area CaCO_3 .

Although it is preferable that the total basis weight of the wrapper is less than 50 gm^{-2} but in other arrangements the total basis weight of the wrapper is less than 35 gm^{-2} .

In certain preferred arrangements one or more of the webs may contain a burn retardant such as ammonium phosphate or a burn enhancer such as a soluble salt of a group I or group II metal, maybe up to 10% by weight.

According to a second aspect of the invention there is provided a smoking article comprising a rod of smoking material and a wrapper having any of the above features.

The term "duplex" as used in this specification is intended to cover sheets which comprise two or more webs wherein at least one web is in the partially formed wet stage prior to drying when the two or more webs are combined or superposed. Thus the adhesion between the two layers is achieved by the fibre bonding inherent in the papermaking process. Furthermore, this method of formation introduces an interaction between the two or more layers, which interaction can have a surprising effect on the air permeability of the final duplex sheet. Clearly the component webs may be formed from different stocks arising from separate headboxes or reservoirs on a multi-wire machine, or at least one web may be produced off-line and re-introduced as a finished sheet to the wet stage of a second paper making machine. In either method of manufacture the objective is to use the fibre structure to provide an integral sheet formed of two or more layers which is capable of being used as a wrapper for smoking articles.

Whereas conventional papers are also asymmetric in that the proportion of fibre to filler may vary from one side of the sheet to the other, it is possible with duplex papers to provide a radical change and alteration in properties from one side to the other rather than the gradual change of properties associated with single wire sheets of conventional form.

Thus it is possible using duplex papers to provide a paper sheet having differing characteristics on one side of the paper from those on the other.

Compared with the use of laminated material or the use of two or more different sheets wrapped together to form a wrapper, the difficulties mentioned above with laminating techniques and running two or more wrappers on a cigarette making machine are of course avoided. Additionally, by utilising a multiple wire machine supplied with different stock to each wire to form a single sheet of such different characteristics across its section, there is observed a synergism which affects the properties of the duplex web not previously discovered or alluded to in the prior art. We have discovered that air permeability due to the inherent porous structure of the paper is not a simple function of the flow through the two component parts but can be very much reduced due to the integrity of the surfaces. The same does not occur when two separate wrappers are brought together after the wet stage following completion of the paper making process.

Table 1 shows air permeability data obtained with the Gurley system for duplex papers and the component parts. In these and subsequent tests the component parts, i.e. inner and top layers or webs, were acquired at the paper making machine by sampling from each web without the two becoming joined together. The sample was then finish treated as a normal sheet.

The Gurley system of air permeability measurement is suitable for assessment of cigarette papers which have low permeabilities relative to usual commercial standards. The method involves measurement of the time taken to displace a fixed volume of air through a defined area of paper under the constant load of a weighted falling piston. The apparatus is sold commercially by W & L E Gurley, Fulton Street, Troy, New York 12181. The test is set out in ISO 3687-1976. In the table, adjacent columns do not correspond.

Table 1

Air Permeability Data (Gurley seconds)				
Sample No	Duplex	Top Layer	Inner Layer	Double Wrap
3	30 000	11	4.5	13
	23 375	10	5	14
		10	6	17
		11	10	
		8		
		9		
6	760 000	65	670	5500
	725075	57	550	6950
		64	830	4950
		52	3140	
		68		
		42		

The interaction between the two surfaces has also been found to secure even lower levels of air permeability than would be achieved with a double wrap comprising each of the components of the duplex paper. Clearly, this is a benefit for formulations where low air permeability is an objective as in the case of cigarettes where a low sidestream smoke may be required.

Additionally it has been observed that the limitations normally imposed on the manufacture of individual webs by poor tensile strength, low basis weight and poor appearance, no longer apply because the duplex paper exhibits properties that are determined by the composite system and these are generally found to be superior to any individual component. As a result it becomes possible to consider duplex characteristics which would not be achievable as a double wrap. Table 2 provides data on tensile strength, basis weight and opacity of duplex papers and its component parts. Opacity being measured on a standard EEL machine (according to BS 4432), on which standard cigarette papers have opacities of 60% or more.

Table 2

Tensile Strength, Basis Weight and Opacity Data									
Sample No	Tensile Strength g mm ⁻¹			Basis Weight, g m ⁻²			Opacity %		
	Dup	Top	Inner	Dup	Top	Inner	Dup	Top	Inner
1	195	95	62	32.6	19.1	13.5	71.6	60.4	20.2
2	211	31	79	37.4	24.1	13.3	71.0	68.2	19.4
5	207	66	69	38.3	23.7	14.6	78.4	66.2	22.0
7	207	14	86	36.3	18.9	17.4	69.4	62.2	18.8
9	311	42	114	47.7	29.6	18.1	77.8	72.4	21.0

In one application the duplex sheet has been formed from two stocks, one of which provides the characteristics of highly impermeable paper and the other of which provides some of the characteristics of conventional cigarette paper, particularly in relation to appearance.

One particular embodiment of the present invention provides a duplex paper for use in the manufacture of cigarettes, which paper has been formed from two or more stocks one of which has a composition that provides the characteristics of a highly impermeable paper and the other of which is stock suited to the manufacture of chalk filled cigarette papers.

There are many uses for wrappers of smoking articles having unusual non-homogeneous cross-sectional characteristics, but one of particular interest is for use with the product of our co-pending British application No 8901579.6 of 25 January 1989, which forms the basis for European application No 90300750.8.

In application 8901579.6, a cigarette paper is required which will produce a self-extinguishing smoking article. This is, of course, contrary to the normal requirement of traditional cigarettes which are expected to

smoulder readily and maintain combustion between puffs. The purpose of this construction is to achieve low and even negligible sidestream smoke deliveries between puffs.

A paper can be made which will readily self-extinguish the cigarette but such papers are normally of the Papirossi type having a high fibre density and low opacity characteristic of impermeable paper sheets.

5 Such highly impermeable papers are unattractive for use on cigarettes since, although they may achieve the objectives set out in our co-pending application, they do not have an appearance which is acceptable to the smoker and, furthermore, readily exhibit uneven burning and excessive charline formation and show staining during smoking.

10 To overcome this disadvantage the highly impermeable, low opacity paper could be overwrapped with conventional cigarette paper. However, the disadvantage of this proposal is that the overwrapping must be done on the cigarette making machine or the two wraps must be laminated thus suffering from the disadvantages outlined above.

15 Double wrapping has been employed commercially in the U.S.A. by Philip Morris on the Virginia Superslims brand, but in this construction it results in a total paper basis weight of 70 gm^{-2} compared to conventional papers at about 25 gm^{-2} . Thus to achieve more conventional weights of paper the two components of the double wrap must be exceptionally low basis weight and may be low in strength which would therefore be difficult and in some cases impossible to make or use commercially as a single sheet.

20 In one embodiment of the present invention the problem can be solved by forming a duplex paper in which a stock for highly impermeable low opacity paper is used to produce a partially formed web which is combined with a partially formed web made from stock of a more conventional cigarette paper, the two partially formed webs being combined before drying to form a duplex sheet having differing characteristics from one side of the sheet to the other.

25 By using such duplex papers in making cigarettes, the conventional appearance can be placed on the outside of the cigarette with a lower opacity reverse side against the tobacco, thus providing the characteristics required for the product without detracting from the appearance, and without staining etc.

30 Furthermore, as an integral duplex sheet the interaction between the two components increases tensile strength and creates an opportunity to manufacture low basis weight sheets with properties that, as single sheets, would be unacceptable for manufacturing reasons. Paper manufacturing developments have produced a duplex cigarette paper with a weight of 32 gm^{-2} ; this being comprised of a dense low permeability, low opacity layer of 15 gm^{-2} and a higher permeability, higher opacity chalk-filled layer. The data for this paper are given in table 3. Conventional cigarette paper making methods will not produce a paper with the same properties as this duplex sheet. Further reductions in basis weight are feasible with this system whilst still maintaining acceptable appearance, strength etc.

35 Table 3

Data for 32 gm^{-2} Duplex Paper										
Sample No	Basis Weight gm^{-2}			CaCO ₃ %	Air Perm Gurley(s)			Opacity %		
	Dup	Top	Inner	Top	Dup	Top	Inner	Dup	Top	Inner
4	32.0	18.2	14.8	27.9	13900	1	640	68	61	18
	31.3	18.2	15.3		93000	1		68	61	19
	30.8	18.0	14.0		21050	1		67	60	18
					6650	2		67	61	20
								68	62	18

50 Additionally, the experience of manufacturing duplex papers has shown that it has reduced thickness compared with the sum of the thicknesses of the two layers from which it is formed, thus further emphasising the integrity of the forming process. Table 4 shows thickness data for a range of duplex formulations.

Table 4

Thickness Data for Duplex Paper and Component Parts (micrometres)			
Sample No	Duplex	Top	Inner
1	49	38	22
3	57	49	25
8	65	46	34

It will be appreciated that there are many other applications of duplex papers in cigarette making. Unusual characteristics required for the wrapper may be achieved without detriment to appearance or handling in cigarette manufacture. These unusual characteristics can be provided by the inner face of the duplex wrapper whilst maintaining the desired appearance with the outer surface.

The paper characteristics may be designed to modify taste, burn rate, sidestream smoke delivery, ignition proclivity or even to achieve changes in appearance.

The construction can provide opportunities to include paper additives or fillers with beneficial effect such as improvements to the ideas contained in the patent literature. For example, the outer surface may include a disproportionately high level of calcium carbonate of normal or enhanced specific surface area such as is suggested in GB Patent 2191930A while the inner surface provides control of air permeability, strength and staining, and where this construction has as its objective reductions in sidestream smoke.

Further examples are achieved by the replacement of calcium carbonate in the outer surface with an alternative filler chosen from a list of those which demonstrate sidestream reducing properties when used as single sheets, conferring on them the benefits of duplex manufacture that is strength, control of air permeability, resistance to staining and enhanced reduction of sidestream smoke. Suggested fillers are: magnesium hydroxide as detailed in US 4231377 and GB 2118986B; aluminium hydroxide, calcium hydroxide or lithium hydroxide (US 4721120); gamma alumina (US 4108151) or those contained in GB 2191930, although this list is by no means exhaustive.

Other wrapper modifications have been suggested in the literature to improve taste and reduce smoke deliveries as for example in US 4225636 and US 4505282 where a carbon inner liner is proposed. A similar objective could be achieved with a duplex wrapper where the external surface provides conventional appearance and the internal surface contains a suitable proportion of activated carbon. The resulting wrapper might even be designed to provide a suitable combustion source to meet the requirements of one of the embodiments described in co-pending UK patent application No 8901579.6.

The system might also be designed with a low absorbing inner surface as a solution to yellow spotting during storage of cigarettes without a need for double wraps which has been proposed by at least one commercial paper manufacturer.

A duplex wrapper for cigars may also be devised as a means of replacing the binder and overwrap currently used in the manufacture of the majority of cigars. The advantage of a duplex construction is to provide scope in the formulation of the two surfaces not achievable with conventional paper made wrappers in order to enable the desired appearance, burning properties and taste to be achieved.

It will of course be appreciated that the duplex papers discussed in this specification are formed from stocks which are made up in accordance with recognised paper making techniques and which can contain, either separately or as chosen mixtures, textile fibres (such as flax or hemp), hard wood fibres, soft wood fibres and other fibres (such as esparto).

The invention will now be illustrated by way of some examples.

Example 1

The requirement for low porosity, which affects cigarette coal shape and propagation was dictated by the need to trap condensable vapour phase which normally emerges from behind the coal as sidestream "smoke" and also to reduce the consumption of tobacco between puffs, thereby reducing the production of sidestream emissions. Initially this need was met with a double wrap in which the inner wrap provided low porosity and high density but was translucent and burnt unevenly. The outer wrap was normal cigarette paper and provided good appearance and even burning.

The idea of a lightweight duplex paper was pursued as a solution to the problems of manufacturing double wrapped cigarettes, a desire for a low weight of paper and a dislike of and lack of success with adhesive laminations and coatings.

The duplex paper had the following specification:

Table 5

Duplex Paper Specification		
	Basis Weight, gm ⁻²	Fibre Type
Duplex	37	
Top	25	40% Pine 20% Birch 40% Eucalyptus
Inner	12	70% Pine 30% Birch
Calcium Carbonate, % (Top Layer)	22	
Air permeability, Gurley(s) 385000		
Sample Code 0589987		

Cigarettes were made with expanded tobacco blend to a density of 143 Kg^m⁻³ and incorporating the fuel element described in the co-pending application. These were compared in smoking test with commercial cigarettes to establish mainstream and sidestream total particulate matter (TPM) deliveries. The results in Table 6 were obtained.

Table 6

Type	No Puffs	Mainstream TPM mg cig ⁻¹	Sidestream TPM mg min ⁻¹	Oven Dry Density Kg ^m ⁻³
Vantage Excel (RJR-USA)	x 6.3 SD 0.5 n 30	11.4 1.9 10	1.3 0.09 10	142
Embassy Mild (ITL-UK)	x 9.0 SD 0.4 n 24	9.4 0.9 7	2.32 0.12 8	234
Test Sample	x 13.8 SD 1.0 n 29	6.6 0.8 9	0.55 0.05 9	143

These results show the substantial reduction in rate of sidestream production for the test cigarette compared with a commercial low sidestream product (Vantage) available from R J Reynolds of U.S.A. and a typical low tar UK brand. The results also show the significantly increased puff number obtained from an equal or lower density and therefore lower weight of tobacco. (These cigarettes had similar circumferences and tobacco length).

Additionally the appearance of the cigarette paper was consistent with commercial brands and there was no appreciable yellow spotting prior to smoking or staining during smoking.

Ash characteristics were improved compared with ordinary low air permeability papers and further improvements were observed with the use of ash conditioning additives, for example potassium citrate applied at levels up to 7% of paper weight.

Example 2

An early attempt at manufacturing a duplex cigarette paper produced a relatively high permeability chalk "free" inner layer and a lower permeability chalk filled top layer. The pulps used were a mixture of eucalyptus and flax. Two samples were produced to achieve different levels of permeability in the chalk filled layer. Paper details are given in Table 7 below, the fibres in both webs of both samples comprising 50% Flax 50% Eucalyptus.

Table 7

Duplex Paper 0189969A and B		
Basis weight, gm ⁻²	0189969A	0189969B
Duplex	43.6	42.3
Top	24.8	25.6
Inner	17.3	17.3
Air Permeability, Coresta Units		
Duplex	10	8
Top	59	29
Inner	94	94
Calcium Carbonate, % Top Layer	34	36
Opacity, % (Duplex)	84.6	84.5

Coresta permeability is a standard measure used in the tobacco industry for cigarette paper air permeability. The apparatus involves a sample clamp which exposes a 2 cm² sample to a constant pressure of 1 kilo Pascal and provides a means of measuring the flow rate through the sample. Results are quoted in units of ml/min/cm²/K Pa.

Cigarette samples were made for mainstream and sidestream smoking tests to a specification which is consistent with some UK low tar commercial cigarettes, i.e. 59mm tobacco rod, 25 mm filter, 24.9 mm circumference, 210 kg m⁻³ oven dry tobacco density, and 45% tip ventilation.

In smoking tests these cigarettes were found to free smoulder without the assistance of a puffing source. They produced about 8 mg of total particulate matter (TPM) from 10 puffs with a standard smoking regime using a 35 ml puff volume over 2 seconds, repeated every minute.

Sidestream smoke deliveries were measured as TPM collected on a filter pad and as an aerosol density index according to methods described in co-pending patent application 8901579.6.

Table 8

	Conventional Low Tar Cigarettes	0189969A	0189969B
Mainstream TPM, mg cig ⁻¹	9.4	7.8	9.2
Puffs	9.0	10.3	10.1
Carbon Monoxide, mg cig ⁻¹		14.4	18.0
Sidestream TPM, mg min ⁻¹	2.32	1.3	1.4
Visible Sidestream Index, (average value)	5.7	2.7	2.8

Reductions in the sidestream smoke in excess of 40% were obtained with this construction whilst maintaining a paper of good appearance and capable of sustaining free smoulder without the use of burn enhancing additives.

Example 3

In this example we have demonstrated a means of achieving an alternative wrapper for a free smouldering low sidestream cigarette which improves upon the reductions in sidestream smoke delivery obtained in example 2. In summary, we have taken the knowledge gained in the development of papers and product specifications for our co-pending patent 8901579.6 and with the use of burn promoters (already well known to the industry) applied to the paper we have been able to produce a free smouldering (self sustaining coal) low sidestream cigarette with typical UK cigarette dimensions, appearance and mainstream smoke deliveries.

The duplex paper samples were selected on the basis of previous test data and were treated with a solution of potassium citrate to achieve the levels shown in Table 9 below. Treatment was carried out by surface contact between the top side of the duplex paper and the liquid reservoir, followed by subsequent drying and rewinding. The process could be replicated through the usual on-line cigarette paper machine soluble additive application facilities such as a size press, and other soluble additives selected from the

range of cigarette paper additives known in the prior art would be suitable.

The additive level was checked after application and cigarettes were made with each of the treated papers for mainstream and sidestream smoke delivery measurements. Details of the cigarette papers are given in Table 9.

Table 9

Cigarette Paper Details			
		0389978B	0989923
Basis weight, gm^{-2}			
Duplex		37.1	37.8
Top Layer		25.4	26.4
Inner Layer		14.5	11.3
Fibres	Top Layer (Pine/Birch/Eucalyptus) Inner Layer (Pine/Birch)	43/17/40% 70/30%	40/20/40% 70/30%
Air Permeability, Gurley(s)			
Duplex		240,000	27,600
Top Layer		4	10
Inner Layer		1480	6
Calcium Carbonate, % Top Layer		23.2	33.5
Opacity, % Duplex		74	80
Tensile, g mm^{-1} Duplex		-	168
% Potassium Citrate		6.9	5.3

The cigarette dimensions were typical of UK commercial brands but tobacco density was reduced to 110 kg m^{-3} using cut tobacco expanded by at least 75% of its bulk volume using a commercially available tobacco expansion process. The precise level of expansion or mixture of expanded and non-expanded tobacco is a matter for determination in order to achieve an acceptable balance of cigarette draw resistance, tobacco rod firmness and combustion rate.

The cigarette construction was as follows: 59 mm tobacco rod, 25 mm filter, 24.8 mm circumference, 110 kg m^{-3} oven dry density, 50% tip ventilation, and 100% of highly expanded cut tobacco blend.

Smoking tests were carried out according to standard procedures to assess mainstream deliveries and sidestream measurements were confined to an assessment of the aerosol density using the "visible index" method described in our co-pending application 8901579.6. The following data was obtained:

Table 10

	Conventional Low Tar Cigarettes	0389978B	0989923
Mainstream TPM, mg cig^{-1}	9.4	10.2	8.8
Puffs	9.0	7.0	6.8
Carbon Monoxide, mg cig^{-1}	-	13.0	11.9
Static burn time, s mm^{-1}	12	11.9	10.3
Sidestream Visible Index (average value)	5.7	0.5	0.5

These results demonstrate very substantial improvements in sidestream reduction compared with the previous example and are achieved with a paper that has good visual and burning characteristics and is substantially free of unsightly staining. Furthermore these products will free smoulder without the need for an additional fuel source and permit substantial reductions in tobacco weight.

Claims

Claims for the following Contracting States : AT, BE, CH, DE, ES, FR, GB, GR, IT, LI, LU, NL, SE

- 5 1. A paper wrapper for smoking articles, which wrapper comprises two or more plies formed from discrete webs while at least one of the webs is in the wet stage of formation whereby there is interaction of the fibres between adjoining plies such that the wrapper is in the form of a single sheet, each component ply having a basis weight of less than 20 g/m².
- 10 2. A wrapper as claimed in claim 1 wherein the two or more webs are formed from different stocks.
3. A wrapper as claimed in claim 1 or claim 2 wherein said two or more webs are combined when all of the webs are in the wet stage of formation prior to drying.
- 15 4. A wrapper as claimed in any one of claims 1 to 3 wherein the wrapper is of low air permeability.
5. A wrapper as claimed in claim 4 wherein said permeability is 10 Coresta or less.
6. A wrapper as claimed in any one of claims 1 to 5 wherein two partially formed webs are combined.
- 20 7. A wrapper as claimed in claim 6 wherein one web is a substantially unfilled web having a low inherent permeability so as to prevent or substantially reduce staining during smoking and yellow spotting during storage.
- 25 8. A wrapper as claimed in claim 6 or claim 7 wherein said one web contains activated carbon.
9. A wrapper as claimed in claim 7 or 8 wherein the other web is a filled web conferring a conventional appearance on the wrapper.
- 30 10. A wrapper as claimed in claim 9 wherein the opacity of the wrapper is 60% or more.
11. A wrapper as claimed in claim 9 or claim 10 wherein the filler of said other web comprises predetermined amounts of calcium carbonate.
- 35 12. A wrapper as claimed in claim 11 wherein the web comprises up to 50% weight of calcium carbonate.
13. A wrapper as claimed in any one of claims 9 to 12 wherein the filler of said other web comprises predetermined amounts of selected fillers, e.g. Mg (OH)₂, Al₂O₃, LiOH and high surface area CaCO₃.
- 40 14. A wrapper as claimed in any one of claims 1 to 13 wherein the total basis weight of the wrapper is less than 50 gm⁻².
15. A wrapper as claimed in claim 14 wherein the total basis weight of the wrapper is less than 40 gm⁻².
- 45 16. A wrapper as claimed in claim 15 wherein the total basis weight of the wrapper is less than 35 gm⁻².
17. A wrapper as claimed in any one of claims 1 to 16 wherein one or more of the webs contains a burn retardant and/or a burn enhancer.
- 50 18. A wrapper as claimed in claim 17 wherein the burn retardant is ammonium phosphate.
19. A wrapper as claimed in claim 17 or claim 18 wherein the burn enhancer is less than 10% weight of a soluble salt of a group I or group II metal.
- 55 20. A smoking article comprising a rod of smoking material and a wrapper as claimed in any one of claims 1 to 19.
21. A smoking article as claimed in claim 20 wherein a filter is provided, which filter may or may not be ventilated.

22. A smoking article as claimed in claim 20 or claim 21 wherein the rod of smoking material contains between 0 and 100% expanded tobacco, the oven dry density of the smoking material in the article is between 80 and 260 Kgm⁻³, the circumference of the rod is between 10 and 30 mm and the length of the rod is between 25 and 100 mm.

23. A smoking article as claimed in claim 20 or claim 21 wherein the low inherent permeability of the wrapper causes the smoking material to extinguish between puffs, and a combustion source is incorporated in the smoking article and is adapted to reignite the smoking material during puffs thereby causing the smoking material to combust, the smoking material being contained in said wrapper which retains a conventional appearance.

24. A smoking article as claimed in claim 20 or claim 21 wherein the wrapper air permeability is 27600 Gurley seconds or more and the basis weight is about 37 gm⁻², all the tobacco is expanded and the density is 110 Kgm⁻³, the rod is 59 mm long and has a 24.8 mm circumference, a filter having a 25 mm length and giving 50% ventilation is provided and the wrapper also contains up to 10% weight of potassium citrate.

Claims for the following Contracting State : DK

1. A paper wrapper for smoking articles, which wrapper comprises two or more plies formed from discrete webs characterised in that the wrapper is formed while at least one of the webs is in the wet stage of formation whereby there is interaction of the fibres between adjoining plies such that the wrapper is in the form of a single sheet.

2. A wrapper as claimed in claim 1 wherein each component ply has a basis weight of less than 20 g/m².

3. A wrapper as claimed in claim 1 wherein the two or more webs are formed from different stocks.

4. A wrapper as claimed in any one of claims 1 to 3 wherein said two or more webs are combined when all of the webs are in the wet stage of formation prior to drying.

5. A wrapper as claimed in any one of claims 1 to 4 wherein the wrapper is of low air permeability.

6. A wrapper as claimed in claim 5 wherein said permeability is 10 Coresta or less.

7. A wrapper as claimed in any one of claims 1 to 6 wherein two partially formed webs are combined.

8. A wrapper as claimed in claim 7 wherein one web is a substantially unfilled web having a low inherent permeability so as to prevent or substantially reduce staining during smoking and yellow spotting during storage.

9. A wrapper as claimed in claim 7 or claim 8 wherein said one web contains activated carbon.

10. A wrapper as claimed in claim 8 or 9 wherein the other web is a filled web conferring a conventional appearance on the wrapper.

11. A wrapper as claimed in claim 10 wherein the opacity of the wrapper is 60% or more.

12. A wrapper as claimed in claim 10 or claim 11 wherein the filler of said other web comprises predetermined amounts of calcium carbonate.

13. A wrapper as claimed in claim 12 wherein the web comprises up to 50% weight of calcium carbonate.

14. A wrapper as claimed in any one of claims 10 to 13 wherein the filler of said other web comprises predetermined amounts of selected fillers, e.g. Mg (OH)₂, Al₂O₃, LiOH and high surface area CaCO₃.

15. A wrapper as claimed in any one of claims 1 to 14 wherein the total basis weight of the wrapper is less than 50 gm⁻².

16. A wrapper as claimed in claim 15 wherein the total basis weight of the wrapper is less than 40 gm^{-2} .
17. A wrapper as claimed in claim 16 wherein the total basis weight of the wrapper is less than 35 gm^{-2} .
- 5 18. A wrapper as claimed in any one of claims 1 to 17 wherein one or more of the webs contains a burn retardant and/or a burn enhancer.
19. A wrapper as claimed in claim 18 wherein the burn retardant is ammonium phosphate.
- 10 20. A wrapper as claimed in claim 18 or claim 19 wherein the burn enhancer is less than 10% weight of a soluble salt of a group I or group II metal.
21. A smoking article comprising a rod of smoking material and a wrapper as claimed in any one of claims 1 to 20.
- 15 22. A smoking article as claimed in claim 21 wherein a filter is provided, which filter may or may not be ventilated.
- 20 23. A smoking article as claimed in claim 21 or claim 22 wherein the rod of smoking material contains between 0 and 100% expanded tobacco, the oven dry density of the smoking material in the article is between 80 and 260 Kg m^{-3} , the circumference of the rod is between 10 and 30 mm and the length of the rod is between 25 and 100 mm.
- 25 24. A smoking article as claimed in claim 21 or claim 22 wherein the low inherent permeability of the wrapper causes the smoking material to extinguish between puffs, and a combustion source is incorporated in the smoking article and is adapted to reignite the smoking material during puffs thereby causing the smoking material to combust, the smoking material being contained in said wrapper which retains a conventional appearance.
- 30 25. A smoking article as claimed in claim 21 or claim 22 wherein the wrapper air permeability is 27600 Gurley seconds or more and the basis weight is about 37 gm^{-2} , all the tobacco is expanded and the density is 110 Kg m^{-3} , the rod is 59 mm long and has a 24.8 mm circumference, a filter having a 25 mm length and giving 50% ventilation is provided and the wrapper also contains up to 10% weight of potassium citrate.

Patentansprüche

Patentansprüche für folgende Vertragsstaaten : AT, BE, CH, DE, ES, FR, GB, GR, IT, LI, LU, NL, SE

- 40 1. Papierumhüller für Rauchartikel, der aus zwei oder mehr Lagen besteht, die aus diskreten Bahnen gebildet sind, während mindestens eine der Bahnen die Naßstufe der Herstellung einnimmt, wobei eine Wechselwirkung der Fasern zwischen benachbarten Lagen besteht, derart, daß der Umhüller die Form eines einzelnen Bogens hat, bei dem jede Komponentenlage ein Basisgewicht von weniger als 20 g/m^2 hat.
- 45 2. Umhüller nach Anspruch 1, bei dem die zwei oder mehr Bahnen aus unterschiedlichen Materialien hergestellt sind.
3. Umhüller nach Anspruch 1 oder 2, bei dem die zwei oder mehr Bahnen kombiniert sind, wenn alle Bahnen vor dem Trocknen die Naßstufe der Herstellung einnehmen.
- 50 4. Umhüller nach einem der Ansprüche 1 - 3, der eine geringe Luftpermeabilität hat.
5. Umhüller nach Anspruch 4, bei dem die Permeabilität 10 Coresta-Einheiten oder weniger beträgt.
- 55 6. Umhüller nach einem der Ansprüche 1 - 5, bei dem zwei teilweise geformte Bahnen miteinander kombiniert sind.

7. Umhüller nach Anspruch 6, bei dem eine Bahn eine im wesentlichen ungefüllte Bahn mit einer geringen eingepprägten Permeabilität ist, damit ein Einfärben während des Rauchens und eine Gelbfleckenbildung während des Lagerns verhindert oder wesentlich reduziert wird.
- 5 8. Umhüller nach Anspruch 6 oder 7, bei dem eine Bahn aktivierten Kohlenstoff enthält.
9. Umhüller nach Anspruch 7 oder 8, bei dem die andere Bahn eine gefüllte Bahn ist, die dem Umhüller ein herkömmliches Aussehen gibt.
- 10 10. Umhüller nach Anspruch 9, bei dem die Opazität des Umhüllers 60 % oder mehr beträgt.
11. Umhüller nach Anspruch 9 oder 10, bei dem der Füllstoff der anderen Bahn vorbestimmte Mengen an Kalziumkarbonat aufweist.
- 15 12. Umhüller nach Anspruch 11, bei dem die Bahn bis zu 50 Gewichtsprozent Kalziumkarbonat enthält.
13. Umhüller nach einem der Ansprüche 9 - 12, bei dem der Füllstoff der anderen Bahn vorbestimmte Mengen an ausgewählten Füllstoffen enthält, z.B. $Mg(OH)_2$, Al_2O_3 , $LiOH$ und $CaCO_3$ mit großem Oberflächenbereich.
- 20 14. Umhüller nach einem der Ansprüche 1 - 13, bei dem das Gesamtbasisgewicht des Umhüllers kleiner als 50 gm^{-2} ist.
15. Umhüller nach Anspruch 14, bei dem das Gesamtbasisgewicht des Umhüllers kleiner als 40 gm^{-2} ist.
- 25 16. Umhüller nach Anspruch 15, bei dem das Gesamtbasisgewicht des Umhüllers kleiner als 35 gm^{-2} ist.
17. Umhüller nach einem der Ansprüche 1 - 16, bei dem ein oder mehrere der Bahnen einen Abbrandverzögerer und/oder einen Abbrandverstärker enthalten.
- 30 18. Umhüller nach Anspruch 17, bei dem der Abbrandverzögerer Ammoniumphosphat ist.
19. Umhüller nach Anspruch 17 oder 18, bei dem der Abbrandverstärker weniger als 10 Gewichtsprozent eines löslichen Salzes eines Gruppe I - oder Gruppe II - Metalles ist.
- 35 20. Rauchartikel mit einem Stab aus einem Rauchmaterial und einem Umhüller nach einem der Ansprüche 1 - 19.
21. Rauchartikel nach Anspruch 20, bei dem ein Filter vorgesehen ist, der ventiliert oder nichtventiliert ist.
- 40 22. Rauchartikel nach Anspruch 20 oder 21, bei dem der Stab aus Rauchmaterial zwischen 0 und 100 % expandierten Tabak enthält, die Ofentrocknungsdichte des Rauchmaterials in dem Artikel zwischen 80 und 260 kgm^{-3} , der Umfang des Stabes zwischen 10 und 30 mm und die Länge des Stabes zwischen 25 und 100 mm beträgt.
- 45 23. Rauchartikel nach Anspruch 20 oder 21, bei dem die geringe eingepprägte Permeabilität des Umhüllers bewirkt, daß das Rauchmaterial zwischen einzelnen Zügen erlischt, und eine Verbrennungsquelle in den Rauchartikel eingesetzt ist, die in der Lage ist, das Rauchmaterial während einzelner Züge erneut zu zünden, wodurch das Rauchmaterial zur Verbrennung gebracht wird, wobei das Rauchmaterial in dem Umhüller angeordnet ist, der ein herkömmliches Aussehen beibehält.
- 50 24. Rauchgegenstand nach Anspruch 20 oder 21, bei dem die Umhüller-Luftpermeabilität $27.600\text{ Gurley-Sekunden}$ oder darüber, und das Basisgewicht etwa 37 gm^{-2} beträgt, der gesamte Tabak expandiert ist und die Dichte 110 kgm^{-3} beträgt, der Stab eine Länge von 59 mm und einen Umfang von 24,8 mm hat, ein Filter eine Länge von 25 mm hat und eine 50 %ige Ventilation ergibt, und der Umhüller ferner bis zu 10 Gewichtsprozent Kaliumcitrat enthält.
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Patentansprüche für folgenden Vertragsstaat : DK

1. Papierumhüller für Rauchartikel, der aus zwei oder mehr Lagen besteht, die aus diskreten Bahnen gebildet sind, dadurch gekennzeichnet, daß der Umhüller gebildet wird, während mindestens eine der Bahnen die Naßstufe der Herstellung einnimmt, wobei eine Wechselwirkung der Fasern zwischen benachbarten Lagen besteht, derart, daß der Umhüller die Form eines einzelnen Bogens hat.
2. Umhüller nach Anspruch 1, bei dem jede Komponentenlage ein Basisgewicht von weniger als 20 g/m² hat.
3. Umhüller nach Anspruch 1, bei dem die zwei oder mehr Bahnen aus unterschiedlichen Materialien hergestellt sind.
4. Umhüller nach Anspruch 1, 2 oder 3, bei dem die zwei oder mehr Bahnen kombiniert sind, wenn alle Bahnen vor dem Trocknen die Naßstufe der Herstellung einnehmen.
5. Umhüller nach einem der Ansprüche 1 - 4, der eine geringe Luftpermeabilität hat.
6. Umhüller nach Anspruch 5, bei dem die Permeabilität 10 Coresta-Einheiten oder weniger beträgt.
7. Umhüller nach einem der Ansprüche 1 - 6, bei dem zwei teilweise geformte Bahnen miteinander kombiniert sind.
8. Umhüller nach Anspruch 7, bei dem eine Bahn eine im wesentlichen ungefüllte Bahn mit einer geringen eingepprägten Permeabilität ist, damit ein Einfärben während des Rauchens und eine Gelbfleckenbildung während des Lagerns verhindert oder wesentlich reduziert wird.
9. Umhüller nach Anspruch 7 oder 8, bei dem eine Bahn aktivierten Kohlenstoff enthält.
10. Umhüller nach Anspruch 8 oder 9, bei dem die andere Bahn eine gefüllte Bahn ist, die dem Umhüller ein herkömmliches Aussehen gibt.
11. Umhüller nach Anspruch 10, bei dem die Opazität des Umhüllers 60 % oder mehr beträgt.
12. Umhüller nach Anspruch 10 oder 11, bei dem der Füllstoff der anderen Bahn vorbestimmte Mengen an Kalziumkarbonat aufweist.
13. Umhüller nach Anspruch 12, bei dem die Bahn bis zu 50 Gewichtsprozent Kalziumkarbonat enthält.
14. Umhüller nach einem der Ansprüche 10 - 13, bei dem der Füllstoff der anderen Bahn vorbestimmte Mengen an ausgewählten Füllstoffen enthält, z.B. Mg (OH)₂, Al₂O₃, LiOH und CaCO₃ mit großem Oberflächenbereich.
15. Umhüller nach einem der Ansprüche 1 - 14, bei dem das Gesamtbasisgewicht des Umhüllers kleiner als 50 gm⁻² ist.
16. Umhüller nach Anspruch 15, bei dem das Gesamtbasisgewicht des Umhüllers kleiner als 40 gm⁻² ist.
17. Umhüller nach Anspruch 16, bei dem das Gesamtbasisgewicht des Umhüllers kleiner als 35 gm⁻² ist.
18. Umhüller nach einem der Ansprüche 1 - 17, bei dem ein oder mehrere der Bahnen einen Abrandverzögerer und/oder einen Abrandverstärker enthalten.
19. Umhüller nach Anspruch 18, bei dem der Abrandverzögerer Ammoniumphosphat ist.
20. Umhüller nach Anspruch 18 oder 19, bei dem der Abrandverstärker weniger als 10 Gewichtsprozent eines löslichen Salzes eines Gruppe I - oder Gruppe II - Metalles ist.

21. Rauchartikel mit einem Stab aus Rauchmaterial und einem Umhüller nach einem der Ansprüche 1 - 20.
22. Rauchartikel nach Anspruch 21, bei dem ein Filter vorgesehen ist, der ventiliert oder nichtventiliert ist.
- 5 23. Rauchartikel nach Anspruch 21 oder 22, bei dem der Stab aus Rauchmaterial zwischen 0 und 100 % expandierten Tabak enthält, die Ofentrocknungsdichte des Rauchmaterials in dem Artikel zwischen 80 und 260 kgm⁻³, der Umfang des Stabes zwischen 10 und 30 mm und die Länge des Stabes zwischen 25 und 100 mm beträgt.
- 10 24. Rauchartikel nach Anspruch 21 oder 22, bei dem die geringe eingeprägte Permeabilität des Umhüllers bewirkt, daß das Rauchmaterial zwischen einzelnen Zügen erlöscht, und eine Verbrennungsquelle in den Rauchartikel eingesetzt ist, die in der Lage ist, das Rauchmaterial während einzelner Züge erneut zu zünden, wodurch das Rauchmaterial zur Verbrennung gebracht wird, wobei das Rauchmaterial in dem Umhüller angeordnet ist, der ein herkömmliches Aussehen beibehält.
- 15 25. Rauchgegenstand nach Anspruch 21 oder 22, bei dem die Umhüller-Luftpermeabilität 27.600 Gurley-Sekunden oder darüber, und das Basisgewicht etwa 37 gm⁻² beträgt, der gesamte Tabak expandiert ist und die Dichte 110 kgm⁻³ beträgt, der Stab eine Länge von 59 mm und einen Umfang von 24,8 mm hat, ein Filter eine Länge von 25 mm hat und eine 50 %ige Ventilation ergibt, und der Umhüller ferner bis zu 10 Gewichtsprozent Kaliumcitrat enthält.
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Revendications

Revendications pour les Etats contractants suivants : AT, BE, CH, DE, ES, FR, GB, GR, IT, LI, LU, NL, SE

- 25 1. Enveloppe de papier pour articles à fumer, laquelle enveloppe comprend deux ou plus couches formées de bandes discrètes, alors qu'au moins une des bandes est à l'étape mouillée de formation, ce par quoi il y a une interaction des fibres entre les bandes adjacentes de sorte que l'enveloppe est sous la forme d'une feuille unique, chaque couche composante ayant un poids de base de moins de 20 g/cm².
- 30 2. Enveloppe selon la revendication 1, dans laquelle les deux ou plus bandes sont formées de matériaux différents.
- 35 3. Enveloppe selon la revendication 1 ou la revendication 2, dans laquelle les deux ou plus bandes sont combinées alors que toutes les bandes sont à l'étape mouillée de formation avant séchage.
- 40 4. Enveloppe selon l'une quelconque des revendications 1 à 3, dans laquelle l'enveloppe a une faible perméabilité à l'air.
- 45 5. Enveloppe selon la revendication 4, dans laquelle la perméabilité est de 10 Coresta ou moins.
6. Enveloppe selon l'une quelconque des revendications 1 à 5, dans laquelle deux bandes formées partiellement sont combinées.
7. Enveloppe selon la revendication 6, dans laquelle une bande est une bande substantiellement non-remplie ayant une faible perméabilité inhérente de façon à prévenir ou substantiellement réduire une coloration durant l'action de fumer et l'apparition de tâches jaunes durant le stockage.
- 50 8. Enveloppe selon la revendication 6 ou 7, dans laquelle ladite une bande contient du charbon activé.
9. Enveloppe selon la revendication 7 ou 8, dans laquelle l'autre bande est une bande remplie conférant une apparence conventionnelle à l'enveloppe.
- 55 10. Enveloppe selon la revendication 9, dans laquelle l'opacité de l'enveloppe est de 60% ou plus.
11. Enveloppe selon la revendication 9 ou 10, dans laquelle la charge de ladite autre bande comprend des quantités prédéterminées de carbonate de calcium.

12. Enveloppe selon la revendication 11, dans laquelle la bande comprend jusqu'à 50% en poids de carbonate de calcium.
13. Enveloppe selon l'une quelconque des revendications 9 à 12, dans laquelle la charge de ladite autre bande comprend des quantités prédéterminées de charges sélectionnées, par exemple $Mg(OH)_2$, Al_2O_3 , $LiOH$ et du $CaCO_3$ à surface spécifique élevée.
14. Enveloppe selon l'une quelconque des revendications 1 à 13, dans laquelle le poids de base total de l'enveloppe est inférieur à 50 gm^{-2} .
15. Enveloppe selon la revendication 14, dans laquelle le poids de base total de l'enveloppe est inférieur à 40 gm^{-2} .
16. Enveloppe selon la revendication 15, dans laquelle le poids de base total de l'enveloppe est inférieur à 35 gm^{-2} .
17. Enveloppe selon l'une quelconque des revendications 1 à 16, dans laquelle une ou plus des bandes contient un retardateur de combustion et/ou un augmentateur de combustion.
18. Enveloppe selon la revendication 17, dans laquelle le retardateur de combustion est le phosphate d'ammonium.
19. Enveloppe selon la revendication 17 ou 18, dans laquelle l'augmentateur de combustion est moins de 10% en poids d'un sel soluble d'un métal du groupe I ou du groupe II.
20. Article à fumer comprenant un barreau de matériau à fumer et une enveloppe telle que revendiquée dans l'une quelconque des revendications 1 à 19.
21. Article à fumer selon la revendication 20 dans lequel un filtre est fourni, lequel filtre peut être ou ne pas être ventilé.
22. Article à fumer selon la revendication 20 ou 21, dans lequel le barreau de matériau à fumer contient entre 0 et 100% de tabac expansé, la densité séchée à l'étuve du matériau à fumer dans l'article est entre 80 et 260 kgm^{-3} , la circonférence du barreau est entre 10 et 30 mm et la longueur du barreau est entre 25 et 100 mm.
23. Article à fumer selon la revendication 20 ou 21, dans lequel la faible perméabilité inhérente de l'enveloppe fait que le matériau à fumer s'éteint entre les bouffées, et une source de combustion est incorporée dans l'article à fumer et est adaptée pour rallumer le matériau à fumer pendant les bouffées, faisant par là que le matériau à fumer se consume, le matériau à fumer étant contenu dans ladite enveloppe qui garde une apparence conventionnelle.
24. Article à fumer selon la revendication 20 ou 21, dans lequel la perméabilité à l'air de l'enveloppe est de 27600 Gurley secondes ou plus et le poids de base est d'environ 37 gm^{-2} , tout le tabac est expansé et la densité est de 110 kgm^{-3} , le barreau est de 59 mm de long et a une circonférence de 24,8 mm, un filtre ayant une longueur de 25mm et donnant une ventilation de 50% est fourni et l'enveloppe contient également jusqu'à 10% en poids de citrate de potassium.

Revendications pour l'Etat contractant suivant : DK

1. Enveloppe de papier pour articles à fumer, laquelle enveloppe comprend deux ou plus couches formées de bandes discrètes, caractérisée en ce que l'enveloppe est formée alors qu'au moins une des bandes est à l'étape mouillée de formation, ce par quoi il y a interaction des fibres entre les couches adjacentes de sorte que l'enveloppe est sous la forme d'une feuille unique.
2. Enveloppe selon la revendication 1, dans laquelle chaque couche de composant a un poids de base inférieur à 20 g/m^2 .

3. Enveloppe selon la revendication 1, dans laquelle les deux ou plus bandes sont formées de matériaux de départ différents.
- 5 4. Enveloppe selon l'une quelconque des revendications 1 à 3, dans laquelle lesdites deux ou plus bandes sont combinées lorsque toutes les bandes sont à l'étape mouillée de formation avant séchage.
5. Enveloppe selon l'une quelconque des revendications 1 à 4, dans laquelle l'enveloppe a une faible perméabilité à l'air.
- 10 6. Enveloppe selon la revendication 5, dans laquelle ladite perméabilité est de 10 Coresta ou moins.
7. Enveloppe selon l'une quelconque des revendications 1 à 6, dans laquelle deux bandes partiellement formées sont combinées.
- 15 8. Enveloppe selon la revendication 7, dans laquelle une bande est une bande substantiellement non-remplie ayant une faible perméabilité inhérente de façon à empêcher ou substantiellement réduire la coloration pendant fumage et la formation de tâches jaunes pendant le stockage.
9. Enveloppe selon la revendication 7 ou 8, dans laquelle ladite une bande contient du carbon activé.
- 20 10. Enveloppe selon la revendication 8 ou 9, dans laquelle l'autre bande est une bande remplie conférant une apparence conventionnelle à l'enveloppe.
11. Enveloppe selon la revendication 10, dans laquelle l'opacité de l'enveloppe est de 60% ou plus.
- 25 12. Enveloppe selon la revendication 10 ou 11, dans laquelle la charge de ladite autre bande comprend des quantités prédéterminées de carbonate de calcium.
13. Enveloppe selon la revendication 12, dans laquelle la bande comprend jusqu'à 50% en poids de carbonate de calcium.
- 30 14. Enveloppe selon l'une quelconque des revendications 10 à 13, dans laquelle la charge de ladite autre bande comprend des quantités prédéterminées de charges choisies, par exemple $Mg(OH)_2$, Al_2O_3 , $LiOH$ et $CaCO_3$ à haute surface spécifique.
- 35 15. Enveloppe selon l'une quelconque des revendications 1 à 14, dans laquelle le poids de base total de l'enveloppe est inférieur à 50 gm^{-2} .
- 40 16. Enveloppe selon la revendication 15, dans laquelle le poids total de base de l'enveloppe est inférieur à 40 gm^{-2} .
17. Enveloppe selon la revendication 16, dans laquelle le poids de base total de l'enveloppe est inférieur à 35 gm^{-2} .
- 45 18. Enveloppe selon l'une quelconque des revendications 1 à 17, dans laquelle une ou plus des bandes contient un retardateur de combustion et/ou un augmentateur de combustion.
19. Enveloppe selon la revendication 18, dans laquelle le retardateur de combustion est le phosphate d'ammonium.
- 50 20. Enveloppe selon la revendication 18 ou 19, dans laquelle l'augmentateur de combustion est de moins de 10% en poids d'un sel soluble d'un métal du groupe I ou du groupe II.
21. Article à fumer comprenant un barreau de matériau à fumer et une enveloppe tels que revendiqués dans l'une quelconque des revendication 1 à 20.
- 55 22. Article à fumer selon la revendication 21, dans lequel un filtre est fourni, lequel filtre peut être ou ne pas être ventilé.

23. Article à fumer selon la revendication 21 ou 22, dans lequel le barreau de matériau à fumer contient entre 0 et 100% de tabac expansé, la densité séchée à l'étuve du matériau à fumer dans l'article est entre 80 et 260 kgm⁻³, la circonférence du barreau étant entre 10 et 30 mm et la longueur du barreau est entre 25 et 100 mm.

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24. Article à fumer selon la revendication 21 ou 22, dans lequel la faible perméabilité inhérente de l'enveloppe fait que le matériau à fumer s'éteint entre les bouffées, et une source de combustion est incorporée dans l'article à fumer et est adaptée pour rallumer le matériau à fumer pendant les bouffées, faisant par là que le matériau à fumer se consume, le matériau à fumer étant contenu dans ladite enveloppe qui garde une apparence conventionnelle.

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25. Article à fumer selon la revendication 21 ou 22, dans lequel la perméabilité à l'air de l'enveloppe est de 27600 Gurley secondes ou plus et le poids de base est d'environ 37 gm⁻², tout le tabac est expansé et la densité est de 110 kgm⁻³, le barreau est de 59 mm de long et a une circonférence de 24,8 mm, un filtre ayant une longueur de 25 mm et donnant une ventilation de 50% est prévu et l'enveloppe contient également jusqu'à 10% en poids de citrate de potassium.

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