



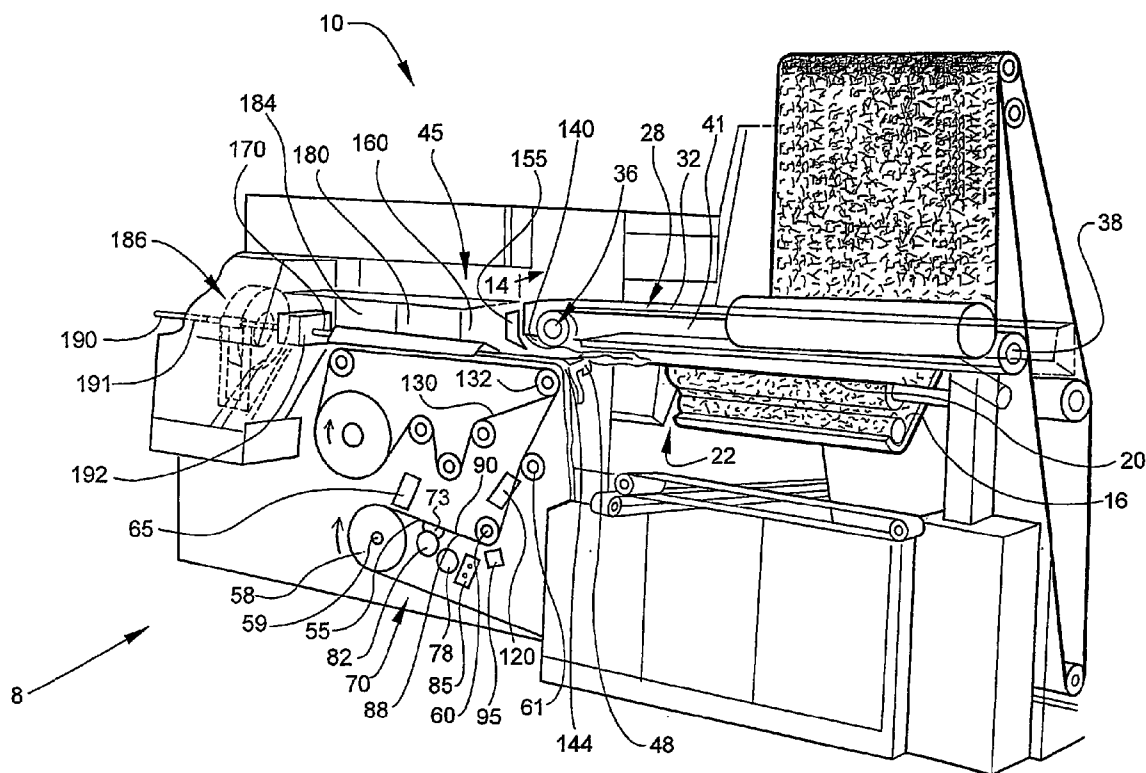
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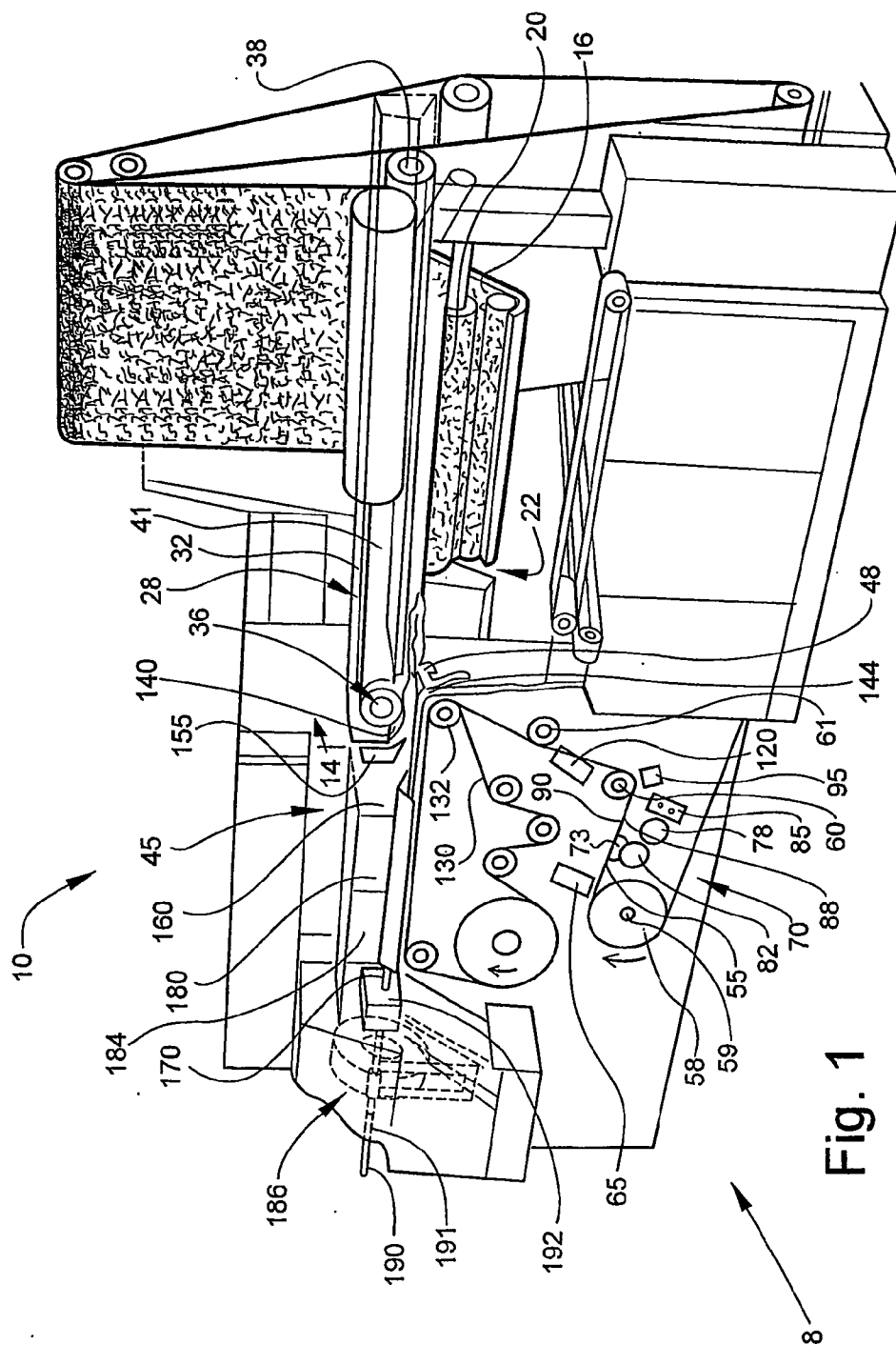
(19) **United States**(12) **Patent Application Publication**  
**Fiebelkorn et al.**(10) **Pub. No.: US 2011/0315153 A1**(43) **Pub. Date: Dec. 29, 2011**(54) **SMOKING ARTICLES AND METHOD FOR  
MANUFACTURING SMOKING ARTICLES****Publication Classification**(76) Inventors: **Richard Fiebelkorn**, London (GB);  
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(52) **U.S. Cl.** ..... **131/284; 131/365**(21) Appl. No.: **13/203,118**(22) PCT Filed: **Jan. 25, 2010**(86) PCT No.: **PCT/EP2010/050803**§ 371 (c)(1),  
(2), (4) Date: **Aug. 24, 2011**(57) **ABSTRACT**

The invention relates to a method of manufacturing a plurality of smoking articles, comprising providing a wrapping paper having a permeability of less than 15 CU and applying a burn retardant additive material in a predetermined pattern to the wrapping paper. The wrapping paper is wrapped about a tobacco material to form a wrapped rod and the wrapped rod is cut to form the plurality of smoking articles. The invention also relates to a smoking article manufactured by the method, wherein the wrapping paper has a permeability of less than 15 CU in areas without the burn retardant additive and a lower permeability in areas where the additive is applied.

(30) **Foreign Application Priority Data**

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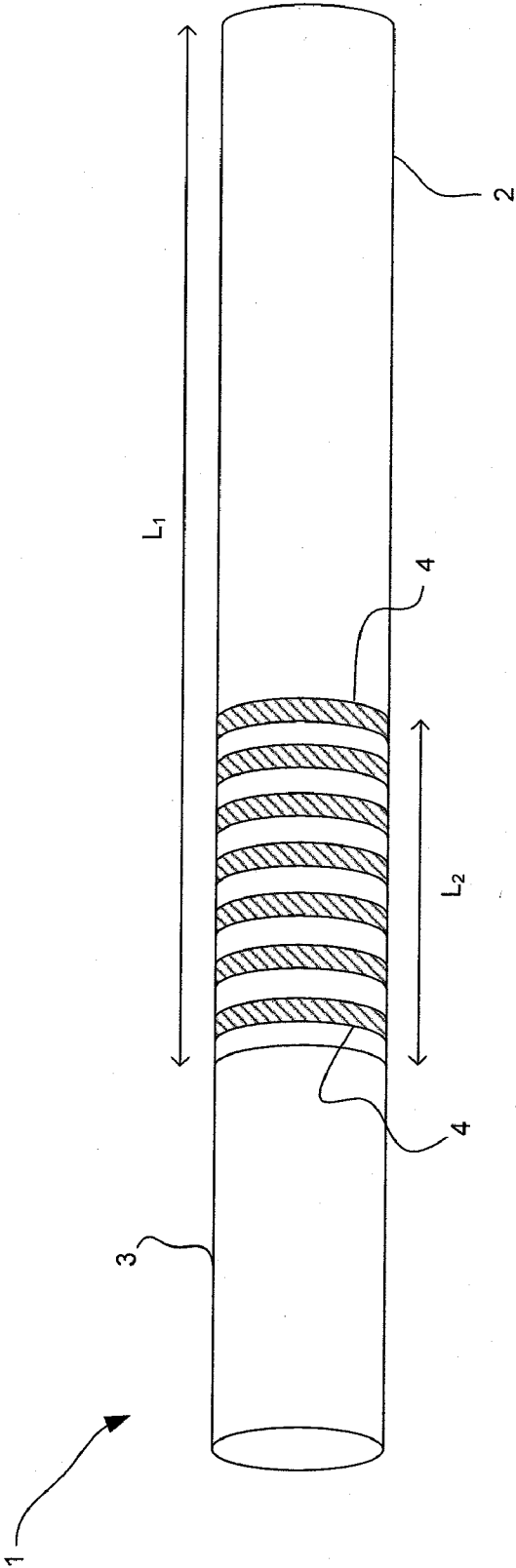


Figure 2

## SMOKING ARTICLES AND METHOD FOR MANUFACTURING SMOKING ARTICLES

### FIELD OF THE INVENTION

**[0001]** The present invention relates to a method for making smoking articles, and more particularly a method for applying a burn retardant additive material to a wrapping paper prior to wrapping the wrapping paper about a tobacco material, to produce a smoking article having a reduced ignition propensity.

### BACKGROUND TO THE INVENTION

**[0002]** Many different methods have been suggested for manufacturing smoking articles such as cigarettes having a reduced ignition propensity i.e. a tendency to self-extinguish when not drawn on by a smoker. The aim is that such cigarettes will self extinguish when dropped or left on a flammable substrate before igniting the flammable substrate. It has been recognised that the constitution of the wrapper has a significant effect on the burn rate of a cigarette and by modifying the wrapper by various methods, a self-extinguishing cigarette can be produced.

**[0003]** One method for making wrappers for smoking articles having reduced ignition propensity is to add bands of paper to the wrapping paper, wherein the composition of the wrapper and the band paper are selected to yield a composite paper having the desired burn rate, as disclosed in EP 0 483998 and EP 0 262550.

**[0004]** Another method is to provide bands of lesser and greater air permeability by embossing the paper, for example, as disclosed in U.S. Pat. No. 4,945,932.

**[0005]** A further method is to chemically treat the paper by applying a burn retardant material to a cigarette paper. The burn retardant additive is typically applied in a pattern such as bands which, in the final assembled cigarette, extend around the circumference of the cigarette. A method for manufacturing a suitable such banded paper is disclosed in W 098/01233. Such banded papers have a number of drawbacks. Firstly, the cost of such papers is typically four to five times the cost of standard cigarette paper. This is due to the cost of the additive material and the additional manufacturing cost of providing a separate apparatus and processing sequence for applying the banded additive and drying the paper prior to manufacturing the cigarettes in the usual way. Furthermore, when the paper is used to manufacture the cigarettes, the bands are randomly situated along the length of the cigarette. It is most desirable for the bands only to occur in portions of the cigarettes close to the filter and it is undesirable for bands to occur at the other end of the cigarette which is the first to be smoked. This is because it is desirable that the cigarette self extinguish towards the end of the smoking and undesirable for the cigarette to self extinguish during the first few millimetres of smoking. When using banded papers, there is no way to ensure that the bands are positioned in particular positions along the cigarette.

**[0006]** A further method of manufacturing a low ignition propensity cigarette is to use a non banded paper of ultra low permeability, typically approximately 5 Coresta Units (CU). These non banded papers are less expensive than the banded papers but also have a number of drawbacks. Firstly, similar to the banded papers, the self extinguishing element is constant along the whole length of the paper and therefore the cigarette may self extinguish at any point. Furthermore, the

extremely low permeability means that the smoulder rate is very low all the way through the smoking and therefore, to deliver an overall tar yield, the tar per puff is low. The low natural permeability of the paper further means that little diffusion of carbon monoxide can occur from the rod, such that the carbon monoxide/tar ratio of the smoke is generally high. Addition of ventilation, for example via Electrostatic Perforation (EP) does not significantly increase the burn rate but dilutes the smoke yield per puff. Furthermore, it has been found that relatively small changes in the physical and chemical properties of the paper can affect its ability to pass the lit ignition propensity test (LIPT), and therefore the CU specifications for low permeability papers will be required to be set at a lower value than optimal so as to ensure compliance to pass the LIPT.

**[0007]** Attempts have been made to apply banding during the cigarette making process. This allows the bands to be positioned at desired locations by synchronising the application of the bands with cutting of the rod formed when the tobacco is wrapped in the banded paper. This overcomes the problem of positioning of the bands found with the pre-manufactured banded papers. This on line application of banding is disclosed in WO 2004/057986 and US 2004/0261805. However, these processes have additional drawbacks which mean that no such system has yet been brought to commercial production. One problem is in the drying of the paper once the burn retardant solution has been applied. Firstly, this must be dried before the garniture section of the machine where the tobacco is wrapped in the paper, because if the paper is damp at this stage when it comes into contact with the tobacco then discolouration of the paper may occur. Furthermore, the machines used for wrapping cigarettes, which may be modified to include a section for applying a burn retardant solution, apply significant tension to the paper and when the paper is damp its tensile strength is significantly reduced so that tearing of the paper easily occurs. Various heaters can be included in the machine to assist in drying the paper but to allow time for these to properly dry the paper, the machine must be slowed. The slowing of the machine may also alleviate problems with tearing, but this decreases production efficiency.

### SUMMARY OF THE INVENTION

**[0008]** The present invention provides a method of manufacturing a plurality of smoking articles, comprising:

**[0009]** providing a wrapping paper having a permeability of less than 15 CU;

**[0010]** applying a burn retardant additive material in a predetermined pattern to the wrapping paper;

**[0011]** wrapping the wrapping paper about a tobacco material to form a wrapped rod; and

**[0012]** cutting the wrapped rod to form the plurality of smoking articles.

**[0013]** The present invention also provides a smoking article, comprising:

**[0014]** a rod of tobacco material;

**[0015]** a wrapping paper surrounding the rod of tobacco material, the wrapping paper having a pattern of a burn retardant additive material applied thereto, the wrapping paper having a permeability of less than 15 CU in areas without the burn retardant additive and a lower permeability in areas where the additive is applied.

**[0016]** The low permeability of the paper means that a smaller amount of burn retardant material needs to be added

to obtain the required self-extinguishing effect. This reduces the problems associated with applying larger amounts of burn retardant material, such as tearing of the paper when it is damp. This means that the application of the burn retardant material can more easily be carried out in one continuous process with the cigarette manufacture. The requirement for heating/drying steps is reduced, although heating steps may still optionally be added before or after the application of the burn retardant additive. Furthermore, the reduction in the amount of burn retardant additive combined with the lower permeability paper enables a degree of online control to be maintained, for instance to take account of variations in paper specification and tobacco density.

[0017] Preferably, the permeability of the wrapping paper is 5 to 10 CU.

[0018] In the method of the present invention, preferably the applying of the burn retardant additive material is synchronised with the cutting of the wrapped rod such that the pattern is located in a predetermined position with respect to an end of each smoking article. Preferably the wrapped rod is cut so that the pattern is located in substantially the same position on each smoking article. Preferably the rod is cut so that the pattern covers 25-50% of the length of the smoking article at one end of the smoking article. Preferably, a filter is attached to the end of the smoking article at which the pattern is formed.

[0019] Preferably, the pattern comprises a plurality of bands which, in the smoking articles, extend around the circumference of the smoking articles.

[0020] Preferably, in the area of the paper to which the pattern is applied, the burn retardant additive material adds less than 10% to the weight of the paper, preferably less than 8%. More preferably the burn retardant additive material adds 0-5% to the weight of the paper, most preferably 2-5%.

[0021] Preferably, the burn retardant additive includes one or more of the following: gums such as guar gum, gum arabic etc, adhesives such as starches, hot melt adhesives,

[0022] PVA etc, organic salts such as alginates and citrates, inorganic salts such as chlorides (eg KCL) and oxides (eg MgO).

[0023] The pattern may be applied by printing or spraying.

[0024] Preferably, the additive is applied to the inner surface of the paper and is in liquid form with viscosity, type, temperature and level of additive applied such that additional heating to dry the paper is not required. In such case additive can be applied directly prior to the area where tobacco is added to the paper bed, such that minimal modification to making equipment is needed and manufacturing efficiency is not impaired.

#### BRIEF DESCRIPTION OF THE DRAWING

[0025] Preferred embodiments of the present invention will now be described with reference to the accompanying drawings, in which:

[0026] FIG. 1 is a schematic illustration of a cigarette making machine suitable for carrying out the method of the present invention; and

[0027] FIG. 2 shows a smoking article according to an embodiment of the present invention.

#### DETAILED DESCRIPTION

[0028] FIG. 1 shows a cigarette making apparatus 10 of a type known in the art, which has been modified to apply a burn

retardant additive material to a wrapping paper prior to forming the wrapping paper into cigarettes. The cigarette making apparatus 10 includes a source of tobacco material 20 which is provided to chimney region 16 where it is blown upwards by air stream 22 onto a lower outside surface of endless conveyor system 28. The endless conveyor system 28 includes a porous belt 32 having a low pressure region 41 into which the tobacco material 20 is drawn, wherein the porous belt 32 retains the tobacco material against the bottom of the conveyor system 28 to form a stream of tobacco material conveyed towards a garniture section 45.

[0029] A paper supply section 8 is provided to supply a continuous web of paper wrapping material 55 from a roll 58 through a series of rollers and guide posts 60, 61 to the garniture section 45 where the wrapping material 55 is wrapped around the tobacco material 20 to form a continuous wrapped rod. Typically, the paper supply section 8 will include a printing device 65 for printing a serial number or indicia onto the paper at predetermined intervals. In the apparatus shown in FIG. 1, the paper supply section 8 has additionally been modified to supply a burn retardant additive material in a pre-determined pattern to the wrapping paper 55. The burn retardant additive material is applied by the applicator section 70 which comprises a reservoir 85 of LIP solution, a pickup roller 78 and a transfer roller 82. The pickup roller has a series of grooves cut into it in the pattern which is to be applied to the paper 55 and picks up LIP solution from the reservoir 85. The solution is picked up in the grooves and transferred to the transfer roller 82 as a pattern of solution. The transfer roller 82 transfers the pattern to the paper 55. The pattern is typically a series of spaced apart bands. The bands will preferably run substantially across the full width of the paper (may have small gap for adhesive sealing) and be 1 mm or more wide (preferably 2-5 mm). The LIP solution in the reservoir 85 may be a liquid or paste containing burn retardant additives such as gums such as guar gum, gum arabic etc, adhesives such as starches, hot melt adhesives, PVA etc, organic salts such as alginates and citrates, or inorganic salts such as chlorides (eg KCL) and oxides (eg MgO). Optionally, the burn retardant material is maintained at a temperature above ambient via heating of the reservoir and/or application system.

[0030] Optionally, the paper 55 may be heated prior to passing through the applicator section 70, to assist in drying the paper. A further heater 120, such as an infra red heater, may heat the paper after the pattern has been applied.

[0031] The applicator section 70 is arranged to apply the burn retardant additive material to the side of the paper 50 which will be the inside of the wrapping material i.e. facing the tobacco when the wrapping material is wrapped around the tobacco material 20 in the garniture section 45.

[0032] The garniture section 45 includes a garniture conveyor belt 130 driven by a roller 132.

[0033] According to the present invention, the wrapping material 55 is paper having a starting permeability of less than 15 CU, preferably 5 to 10 CU. The use of low permeability paper means that the finished cigarette already has more of a tendency to self extinguish even without the burn retardant additive, although without the burn retardant additive the self extinguishing properties would not be sufficient to pass a Lit Ignition Propensity Test. However, the low permeability paper does allow the quantity of burn retardant additive which it is necessary to add to the paper to be reduced, to a level such

that, in the final paper, the burn retardant additive adds less than 8%, preferably 0 to 5%, more preferably 2 to 5% to the weight of the paper.

[0034] Due to the reduced amount of burn retardant, drying of the paper 55 is improved so that heater 120 may not be required. If heater 120 is not required, it is preferable that the applicator section 70 be located as close as possible to the entry of the garniture section 45 to prevent build up or loss of the LIP solution as the paper 55 passes through further rollers before being formed into a wrapped rod in the garniture section 45.

[0035] In the garniture section 45, the garniture conveyor belt 130 conveys the paper 55 under a rail assembly 140 through a garniture entrance cone 144. The tobacco material 20 is carried by the conveyor belt 32 and deposited on the paper web 55 and the finger rail assembly 140 and garniture entrance cone 144 guide the filler material 20 from the porous conveyor belt 32 into the garniture section 45. The garniture section 45 further includes a tongue 160 positioned over the path of the garniture conveyor belt 132. The tongue 160 constricts the tobacco filler 20 on the wrapping paper 55 so that the tongue 160 and the conveyor belt 130 define a passage which decreases in cross section so that the tobacco material is compressed to form a tobacco material rod 170. A folding mechanism 180 located downstream from the tongue 160 compresses the tobacco material 20 further and folds the paper web 55 around the rod 170. An adhesive applicator 184 applies adhesive to an edge of the paper web and secures the edge to an overlapping portion of the paper web 55. The continuous rod 170 then passes to a cutting section 186 where it is divided by a knife into a plurality of smoking articles 190, 191. The knife is located within knife support 192.

[0036] The knife is synchronised with the applicator section 70 so that the rod 170 is cut at positions such that the pattern of burn retardant material on the wrapping paper is located at a particular position on each of the plurality of smoking articles 190, 191. Particularly, the pattern may be applied at one end of each rod, preferably extending over the first 25-50% of the length of the rod. A filter is subsequently applied to the end having the pattern of burn retardant material, and affixed with a tipping paper in a manner known in the art.

[0037] The synchronisation of the knife which cuts the rod into sections and the positioning of bands is achieved via mechanical or electrical means. In the mechanical method, the gearing that moves the knife is joined directly via a series of linkages to the additive applicator. In the electrical method, an electrical pulse, timed by the knife is used to time the applicator mechanism.

[0038] FIG. 2 shows a smoking article 1 according to the present invention, which has been manufactured using the process described above. The smoking article 1 comprises a wrapped rod 2 of tobacco material with a filter 3 at one end. The filter is attached to the wrapped rod 2 with tipping paper and the wrapped rod 2 includes a tobacco core surrounded by a wrapping paper. The wrapping paper has a pattern of a burn retardant additive material applied thereto, the pattern comprising a plurality of spaced apart bands 4. The pattern is located at the filter end of the rod 2. The bands 4 will preferably be 1 mm or more wide (preferably 2-5 mm) and the length  $l_2$  of the wrapped rod 2 to which the bands 4 are applied is 25 to 50% of the length  $l_1$  of the whole wrapped rod 2.

[0039] The wrapping paper has a permeability of less than 15 CU in areas without the burn retardant additive and a lower

permeability in areas where the additive is applied. Preferably the paper has a permeability of 5 to 10 CU in areas without the burn retardant additive.

1. A method of manufacturing a plurality of smoking articles in a making apparatus, comprising:

providing a continuous web of wrapping paper having a permeability of less than 15 CU from a source thereof to an applicator section;

applying a burn retardant additive material in a predetermined pattern to the web of wrapping paper at the applicator section wherein, in the area of the paper to which the pattern is applied;

feeding the web of wrapping paper to which the additive has been applied to a garniture section;

wrapping the web of wrapping paper to which the additive has been applied, about a tobacco material at the garniture section to form a wrapped rod; and

cutting the wrapped rod to form a plurality of smoking articles.

2. The method according to claim 1, wherein the wrapping paper has a permeability of 5 to 10 CU.

3. The method according to claim 1, further comprising synchronising the applying of the burn retardant additive material with the cutting of the wrapped rod such that the pattern is located in a predetermined position with respect to an end of each smoking article.

4. The method according to claim 3, wherein the wrapped rod is cut so that the pattern is located in substantially the same position on each smoking article.

5. The method according to claim 1, wherein the pattern comprises a plurality of bands which, in a smoking article, extend around the circumference of the smoking article.

6. The method according to claim 1, wherein, in the area of the paper to which the pattern is applied, the burn retardant additive material adds less than 10% to the weight of the paper.

7. The method according to claim 1, wherein, in the area of the paper to which the pattern is applied, the burn retardant additive material adds 2-5% to the weight of the paper.

8. The method according to claim 1, wherein the pattern is applied to the paper forming 25-50% of the length of the wrapped rod at one end of the wrapped rod.

9. The method according to claim 8, further comprising attaching a filter to the end of the wrapped rod at which the pattern is formed.

10. The method according to claim 1, wherein the burn retardant additive includes a gum, an adhesive or an organic or inorganic salt.

11. The method according to claim 1, wherein the pattern is applied by printing.

12. The method according to claim 1, wherein the pattern is applied by spraying.

13. The method according to claim 1, comprising heating the additive and applying the heated additive to the paper.

14. The method according to claim 1, comprising heating the paper after application of the pattern.

15. A smoking article, comprising:

a rod of tobacco material;

a wrapping paper surrounding the rod of tobacco material, the wrapping paper having a pattern of a burn retardant additive material applied thereto, the wrapping paper having a permeability of less than 15 CU in areas without the burn retardant additive and a lower permeability in areas where the additive is applied.

**16.** The smoking article according to claim **15**, wherein the wrapping paper has a permeability of 5 to 10 CU in areas without the burn retardant additive.

**17.** The smoking article according to claim **15**, wherein the pattern comprises a plurality of bands which extend around the circumference of a smoking article.

**18.** The smoking article according to claim **15**, wherein, in the area the paper to which the pattern is applied, the burn retardant additive material comprises less than 10% of the weight of the paper.

**19.** The smoking article according to claim **15** wherein, in the area of the paper to which the pattern is applied, the burn retardant additive material adds 2-5% to the weight of the paper.

**20.** The smoking article according to claim **15**, further comprising a filter at one end of the wrapped rod, wherein the pattern is formed over a portion of the length of the wrapped rod adjacent the filter.

**21.** The smoking article according to claim **15**, wherein the pattern is formed over an area covering substantially one half of the length of the wrapped rod.

**22.** The smoking article according to claim **15**, wherein the burn retardant additive includes a gum, an adhesive, or an organic or inorganic salt.

**23.** An apparatus for making a plurality of smoking articles, comprising:

a paper source comprising a continuous web of wrapping paper having a permeability of less than 15 CU, able to supply the web to an applicator section;

the applicator section able to apply a burn retardant additive material in a predetermined pattern to the web of wrapping paper;

a garniture section to receive the web of wrapping paper to which the additive has been applied to wrap it about a tobacco material to form a wrapped rod; and

a cutter for cutting the wrapped rod to form a plurality of smoking articles.

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