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(71) Applicant: **Mudanjiang Hengfeng Paper Co., Ltd
Mudanjiang City, Heilongjiang 157013 (CN)**

(72) Inventors:
• **WANG, Qicheng
Mudanjiang
Heilongjiang 157013 (CN)**

- **LI, Jinsong
Mudanjiang
Heilongjiang 157013 (CN)**
- **CHEN, Yuxiang
Mudanjiang
Heilongjiang 157013 (CN)**
- **ZHAO, Maochen
Mudanjiang
Heilongjiang 157013 (CN)**

(74) Representative: **Dunlop, Hugh Christopher et al
R.G.C. Jenkins & Co.
26 Caxton Street
London SW1H 0RJ (GB)**

(54) **FIRE-RETARDANT, FIRE-RETARDANT BANDED CIGARETTE PAPER, AND
MANUFACTURING METHOD FOR SAME**

(57) The present invention relates to a fire retardant, a cigarette paper with the fire retardant strip and the method for manufacturing the cigarette paper. The fire retardant comprises 10%-30% film-forming material by weight, 10%-30% filling material by weight and 40%-80% solvent. At least one fire retardant strip is provided on a front side and/or back side of the cigarette paper by printing a fire retardant, and the width of the fire retardant strip is 2-8mm. The present invention relates to the technology of manufacturing a cigarette paper with fire retardant strip, and strip coatings with a distance with each other are printed on the cigarette base paper so that gas permeability is reduced in the area of the strip coatings. When the cigarette naturally burns to the area of the fire retardant strip, the cigarette is self-extinguished as the fire retardant strip absorbs the heat and reduces the entry of the oxygen; when the cigarette burns to the area of the fire retardant strip, if the cigarette is smoked, the oxygen would enter into the cigarette, and the cigarette would continue to burn.

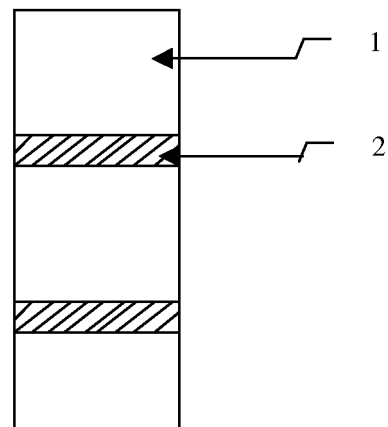


Fig.1

Description

Field of the Invention

[0001] The present application relates to fire retardant, cigarette paper and the method for manufacturing the cigarette paper, more particularly, to a fire retardant, a cigarette paper with a fire retardant strip and a method for manufacturing the cigarette paper.

Description of Related Art

[0002] China is the world's biggest country for cigarette production and cigarette consumption. According to incomplete statistics, China currently has nearly four hundred million smokers, which accounts for 30% of Chinese population. A cigarette butt may by accident cause a fire destroying thousands of hectares of forest, and there are a lot of fire disasters caused by smoking. The temperature at the center of cigarette butt reaches to 700°C-800°C, the temperature at the combustion cone surface also reaches to 300°C-500°C, and the temperature is much higher than ignition point of general solid combustibles, i.e. paper and cloth.

[0003] Therefore, it is required to develop a new technology for improving the security of the cigarette i.e. to provide cigarette with a low ignition. In the meanwhile it is desirable that security of the cigarette is enhanced without losing the traditional characters of cigarette, i.e. taste, shape of cigarette ash and hygienic requirements and so on. A manufacture process of cigarette paper should be adjusted only so as to meet the requirement of the modern cigarette production equipment better. Thus, it is desirable to develop a technology to manufacture cigarette paper with a fire retardant strip meeting the requirement of producing cigarette while consuming relatively less resource and energy.

SUMMARY OF THE INVENTION

[0004] An object of the present invention is to provide a fire retardant with improved safety and reduced manufacturing cost, a cigarette paper with a fire retardant strip and a method for manufacturing the cigarette paper.

[0005] In order to achieve an aspect of above objects, there is provided a fire retardant for a cigarette paper, the fire retardant comprises 10%-30% film-forming material by weight, 10%-30% filling material by weight and 40%-80% solvent by weight, the film-forming material is selected from the group consisting of the following materials: cationic starch, anionic starch, oxidized starch, arabic gum, methylcellulose, carboxymethylcellulose, vinyl alcohol, alginate, or a mixture of any above materials, the filling material is selected from the group consisting of the following materials: calcium carbonate, magnesium oxide, magnesium hydroxide, aluminum hydroxide, talcum powder, or a mixture of any above materials.

[0006] Preferably, the fire retardant comprises 5%-

15% additional agent by weight of the total weight of the film-forming material, filling material and the solvent, and the additional agent is selected from the group consisting of the following materials: viscosity breaking agent, defoaming agent, dispersing agent, softening agent, or a mixture of any above materials.

[0007] Preferably, the solvent is selected from the group consisting of the following materials: water, ethanol, ethyl acetate or ammonia, or a mixture of the above materials.

[0008] Another object of the present invention is to provide a cigarette paper with a fire retardant strip, at least one fire retardant strip is provided on a front side and/or back side of the cigarette paper by printing a fire retardant, and the width of the fire retardant strip is 2-8mm, and the fire retardant is the fire retardant for a cigarette paper according to claim 1 or 2.

[0009] Preferably, at least two fire retardant strips are provided on the cigarette paper, and the distance between the two adjacent fire retardant strips is 10-30mm.

[0010] Preferably, the fire retardant strip may have a shape from the following: bar shape, wave shape, zigzag shape, mesh shape or a combined shape by composing any of the above shape.

[0011] An further object of the present invention is to provide a method for manufacturing a cigarette paper with a fire retardant strip, the method comprises the following steps: forming a film-forming material solution by dissolving a film-forming material into solvent under high speed dispersion, and stirring the film-forming material solution; forming a fire retardant by adding a filling material into the film-forming material solution under high speed dispersion and replenishing the solvent; forming a fire retardant strip by printing the fire retardant on a front side and/or back side of cigarette base paper using a printer, the film-forming material is selected from the group consisting of the following materials: cationic starch, anionic starch, oxidized starch, arabic gum, methylcellulose, carboxymethylcellulose, vinyl alcohol, alginate, or a mixture of any above materials, the filling material is selected from the group consisting of the following materials: calcium carbonate, magnesium oxide, magnesium hydroxide, aluminum hydroxide, talcum powder, or a mixture of any above materials.

[0012] Preferably, further comprises a step of adding additional agent into the film-forming material solution; and the fire retardant is completed by one-time printing, double chromaticity printing, or three-time chromaticity printing.

[0013] With the above technical features, the present invention is advantageous in the following aspects:

The present invention relates to a technology of manufacturing cigarette paper with fire retardant strip where strip coatings with a predetermined distance therebetween are printed on the cigarette base paper so that gas permeability is reduced in the area of the strip coatings. When the cigarette naturally

burns to the area of the fire retardant strip, the cigarette is self-extinguished as the fire retardant strip absorbs the heat and reduces the entry of the oxygen; when the cigarette burns to the area of the fire retardant strip, if the cigarette is smoked, the oxygen will enter into the cigarette due to the smoking, and the cigarette would continue to burn.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The accompanying drawings described here will be made to provide a further understanding for the present invention and constitute a part of the present application; the following exemplary embodiments and the description thereof are made to explain the present invention and will not constitute improper limitations on the invention, wherein:

Fig. 1 is a schematic view of a cigarette paper with a fire retardant strip of the present invention;

Fig. 2 is a schematic view of producing the cigarette using the cigarette paper of the present invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0015] Hereafter, the technical solution of the present invention is further described in detail with reference to the accompanying drawings and following embodiments.

Embodiment 1 :

[0016] Referring to figure 1 and figure 2, wherein a preferred embodiment of the cigarette paper with a fire retardant strip according to the present invention is shown. In the embodiment, at least one fire retardant strip 2 is provided on a front side and/or back side of the cigarette paper 1 by printing a fire retardant, and strip coatings with a predetermined distance therebetween are printed on the cigarette base paper so that gas permeability is reduced in the area of the strip coatings, and the width of the fire retardant strip 2 of the present invention is 2-8mm. Preferably, at least two fire retardant strips 2 are provided on the cigarette paper 1, and the distance between the two adjacent fire retardant strips 2 is 10-30mm. When the cigarette naturally burns to the area of the fire retardant strip 2, the cigarette is self-extinguished as the fire retardant strip 2 absorbs the heat and reduces the entry of the oxygen. In one example, two or more fire retardant strips 2 are provided so as to enhance the retardant frequency, thus improving security of the cigarette. When the cigarette burns to the area of the fire retardant strip, if the cigarette is smoked, the oxygen would enter the cigarette due to the smoking, and the cigarette would continue to burn. The width of the fire retardant strip is neither too narrow nor too wide, if the width is too narrow, the effect of fire retarding would not be achieved; if the width is too wide, the taste of the smoker becomes bad.

[0017] In the present embodiment, as shown in figure

1, two fire retardant strips 2 are provided on the cigarette paper 1, and the fire retardant strip 2 has a bar shape. However, the shape of the fire retardant strip also may be arranged as wave shape, zigzag shape, mesh shape or a composite shape by composing any of the above shapes. In an example, the width of the fire retardant strip 2 is 2-8mm, and the distance between the two adjacent fire retardant strips 2 is 19mm.

10 Embodiment 2:

[0018] Arabic gum of 20% by weight is selected as the film-forming material. However, the present invention is not limited to this. In an example, cationic starch, anionic starch, methylcellulose, vinyl alcohol, alginate, or a mixture of any above materials also may be selected as the film-forming material, and the weight proportion thereof can be the same; optionally calcium carbonate and magnesium hydroxide are selected as the filling material, and the weight proportion of calcium carbonate is 10%, the weight proportion of magnesium hydroxide is 10%, however, magnesium oxide, talcum powder, or a mixture of any above materials may be selected as the filling material. Ethanol is selected as one part of the solvent, and the weight proportion of the ethanol is 24%, and the remaining part of the solvent is water. Preferably, 8% propylene glycol and/or glycerin by the total weight of the above compound as additional agent is added.

[0019] Additionally, water, ethanol, ethyl acetate or ammonia, or a mixture of the above materials may also be selected as the solvent of the present invention.

[0020] When manufacturing the fire retardant, an arabic gum water solution is formed under high speed dispersion, and the film-forming material solution is stirred so as to achieve uniformity; then magnesium hydroxide, calcium carbonate, ethanol, propylene glycol and/or glycerin are added into the solution under high speed dispersion. In practice, it is appreciated for those skilled in the art to adjust the above material and proportion according to different climate, different temperature in different regions, or different humidity, the wrinkling state of the paper, the air permeability, the requirement of the fire retardant strip and the dryness, so as to produce the ideal product.

[0021] Finally, a fire retardant strip 2 is formed on a front side and/or back side of cigarette base paper 1 by printing the fire retardant using a printer, as shown in Figures 1 and 2.

50 Embodiment 3:

[0022] During manufacturing the fire retardant, carboxymethylcellulose is selected as the film-forming material, and the weight proportion thereof is 25%; magnesium hydroxide and aluminum hydroxide are selected as the filling material, and the weight proportion of magnesium hydroxide is 10%, the weight proportion of aluminum hydroxide is 10%, and ethanol is selected as one

part of the solvent, and the weight proportion of the ethanol is 30%, and the remaining part of the solvent is water; preferably, 10% propylene glycol and/or glycerin by the total weight of the above compound as additional agent is added, however, viscosity breaking agent, de-foaming agent, dispersing agent, softening agent, or a mixture of any above materials in the prior art may also be selected as additional agent.

[0023] When manufacturing the fire retardant, a carboxymethylcellulose water solution is formed under high speed dispersion, and the film-forming material solution is stirred so as to achieve uniformity; then magnesium hydroxide and aluminum hydroxide, ethanol, propylene glycol and/or glycerin are added into the solution under high speed dispersion. In practice, it is appreciated for those skilled in the art to adjust the above material and proportion according to different climate, different temperature in different regions, or different humidity, the wrinkling state of the paper, the air permeability, the requirement of the fire retardant strip and the dryness, so as to produce the ideal product.

[0024] Finally, a fire retardant strip 2 is formed on a front side and/or back side of cigarette base paper 1 by printing the fire retardant using a printer, as shown in figure 1.

Embodiment 4:

[0025] When manufacturing the fire retardant, oxidized starch is selected as the film-forming material, and the weight proportion thereof is 10%; magnesium hydroxide and calcium carbonate are selected as the filling material, and the weight proportion of magnesium hydroxide is 5%, the weight proportion of calcium carbonate is 10%, and the remaining part of the solution is water as the solvent. Preferably, 15% propylene glycol and/or glycerin by the total weight of the above compound as additional agent is added.

[0026] During manufacturing of the fire retardant, oxidized starch is gelatinized firstly, after the temperature descends below 60°C, the magnesium hydroxide, calcium carbonate, propylene glycol and/or glycerin are added into the solution, and the solution is stirred so as to achieve uniformity.

[0027] In practice, the cigarette paper with the fire retardant strip manufactured by the material proportion and method of the present invention meets the requirement of cigarette paper printing industry, such as the requirement for concentration, viscosity and bubbling property of the ink. Thus the paper has good printing effect and is cost effective.

[0028] Finally, a fire retardant strip 2 is formed on a front side and/or back side of cigarette base paper 1 by printing the fire retardant using a printer, as shown in figure 1. The position of the fire retardant strip on the front side corresponds to the position of the fire retardant strip on the back side, or the above positions are staggered with each other.

[0029] Preferably, the fire retardant is completed by one-time printing, double chromaticity printing, or three-time chromaticity printing.

[0030] Specifically, the object of the present invention to print the fire retardant coating on the cigarette paper is to reduce gas permeability in the area of the strip coatings, and the major constituent material of the present invention is the film-forming material. Additionally, the filling material is used to reduce the adhesion of the film-forming material so as to prevent the film-forming material from bonding with paper page or the surface of the other elements, and the filling material may also partly help to achieve self-extinguishing function. For example, the magnesium hydroxide may absorb heat and release water. The organic solvent, such as ethanol, added into the solvent functions to speed up drying. The other additional agents of the present invention function to adjust the property of the fire retardant. For example, it helps the fire retardant to meet the requirements for printing ink. More specifically, viscosity or bubbling property of the fire retardant may be adjusted so as to meet the requirements of the quality of the fire retardant for printing.

[0031] Apparently, various fire retardant products may be completed by using the fire retardant, the cigarette paper with the fire retardant strip and the method for manufacturing the cigarette paper according to the present invention.

[0032] It should be noted that above embodiments only are made to explain the technical solutions of the present invention and they are not construed to limit the invention. Although the present invention is described in detail with reference to the preferred embodiments, those skills in the art may understand that the embodiments of the present invention can be modified or the partial technical features are replaceable with equivalents without departing from the spirits of the technical solution of the present invention, which should be considered as within the scope of the present invention.

Claims

1. A fire retardant for a cigarette paper, **characterizing in that:**

the fire retardant comprises 10%-30% film-forming material by weight, 10%-30% filling material by weight and 40%-80% solvent by weight..

2. The fire retardant for a cigarette paper according to claim 1, **characterizing in that:**

the fire retardant comprises 5%-15% by weight additional agent of the total weight of the film-forming material, filling material and the solvent, and the additional agent is selected from the group consisting of the following materials: viscosity breaking agent, de-foaming agent, dis-

persing agent, softening agent, or a mixture of any above materials.

3. The fire retardant for a cigarette paper according to claim 1 or 2, the film-forming material is selected from the group consisting of the following materials: cationic starch, anionic starch, oxidized starch, arabic gum, methylcellulose, carboxymethylcellulose, vinyl alcohol, alginate, or a mixture of any above materials, 5
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4. The fire retardant for a cigarette paper according to claim 1 or 2, the filling material is selected from the group consisting of the following materials: calcium carbonate, magnesium oxide, magnesium hydroxide, aluminum hydroxide, talcum powder, or a mixture of any above materials. 15
5. The fire retardant for a cigarette paper according to claim 1 or 2, **characterizing in that:** 20

the solvent is selected from the group consisting of: water, ethanol, ethyl acetate or ammonia, or a mixture of the above materials. 25
6. A cigarette paper with a fire retardant strip, **characterizing in that:** at least one fire retardant strip is provided on a front side and/or back side of the cigarette paper by printing a fire retardant, and the width of the fire retardant strip is 2-8mm. 30
7. The cigarette paper with a fire retardant strip according to claim 6, **characterizing in that:** at least two fire retardant strips are provided on the cigarette paper, and the distance between the two adjacent fire retardant strips is 10-30mm. 35
8. The cigarette paper with a fire retardant strip according to claim 5 or 6, **characterizing in that:** the fire retardant strip has a shape of bar shape, wave shape, zigzag shape, mesh shape or a composite shape by composing any of the above shapes. 40
9. A method for manufacturing a cigarette paper with a fire retardant strip, **characterizing in that:** the method comprises the following steps: 45

forming a film-forming material solution by dissolving a film-forming material into solvent under high speed dispersion; 50
forming a fire retardant by adding a filling material into the film-forming material solution under high speed dispersion;
forming a fire retardant strip by printing the fire retardant on a front side and/or back side of cigarette base paper using a printer. 55
10. The method according to claim 9, **characterizing in**

that: further comprises a step of adding additional agent into the film-forming material solution; and the fire retardant is completed by one-time printing, double chromaticity printing, or three-time chromaticity printing.

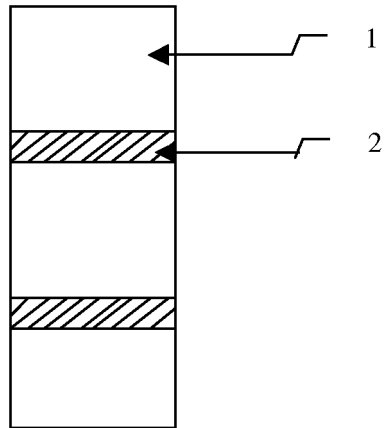


Fig.1

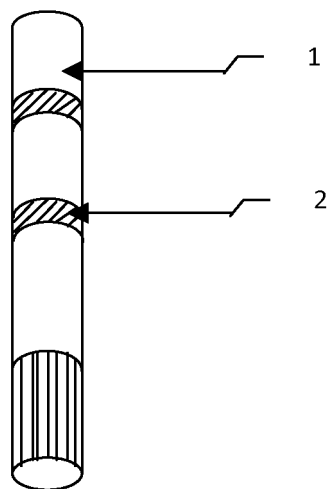


Fig.2