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(74) Agents: KILLIN, Stephen et al.; 20 Little Britain, London
EC1A 7DH (GB).

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(71) Applicant (for all designated States except US): **BRITISH AMERICAN TOBACCO (INVESTMENTS) LIMITED** [GB/GB]; R & D Centre, Regents Park Road, Southampton SO15 8TL (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **HOOPER, Nicole** [GB/GB]; **BRITISH AMERICAN TOBACCO (INVESTMENTS) LIMITED**, R & D Centre, Regents Park Road, Southampton SO15 8TL (GB). **WAN, Peter** [GB/JP]; **BRITISH AMERICAN TOBACCO PACIFIC CORPORATION**, Atago Mori Tower 22F, 2-5-1 Atago, Minato-Ku, Tokyo 105-6222 (JP).

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(54) Title: TIPPING PAPER

(57) Abstract: The present invention provides tipping paper comprising a coolant composition comprising a coolant compound and a nitrocellulosic lacquer; smoking articles comprising such tipping paper; and a process for preparing such tipping paper.



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TIPPING PAPER

Field

5 The present invention relates to tipping paper, in particular tipping paper comprising a coolant compound and a carrier and/or solvent for the coolant compound; and to processes for making the same. In particular, the tipping paper comprises a coolant compound and a nitrocellulosic lacquer. The present invention also relates to smoking articles comprising such tipping paper, and a process for preparing such tipping paper.

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Background

Smoking articles such as cigarettes, are conventionally rod-shaped and comprise two main sections. The first section comprises smokable material (such as shredded tobacco) surrounded by a wrapper to form a “smokable rod”. Typically the wrapper is made of paper. The second section is a filter element comprising a filter material (such as cellulose acetate tow) surrounded by a wrapping material known as a “plug wrap”. Typically the plug wrap is made of paper. Conventionally, the smokable rod and the filter element abut each other in an end-to-end relationship. The smokable rod and the filter element are attached to each other by tipping paper. Typically, the tipping paper circumscribes the sections of the smokable rod and the filter element where they abut against each other. The tipping paper holds the smokable rod and the filter element in axial alignment.

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A number of coolant compounds are known that provide a sensation of “cooling” when contacted to the skin and on the mucous membranes of the body, such as those of the nose, mouth and throat. One of the best known coolant compounds is menthol. Coolant compounds, such as menthol, are believed to provide a physiological effect in a consumer by direct action of the coolant compound on the nerve endings of the consumer that are responsible for the detection of hot and cold.

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US 4,059,118 discloses spraying tobacco, or impregnating a filter tip of a cigarette, with an ethanolic solution of a coolant compound. The coolant compounds disclosed are derivatives of p-menthane, such as p-menthane-3-carboxylic acid.

US 4,060,091 discloses spraying tobacco, or impregnating a filter tip of a cigarette, with an ethanolic solution of p-menthane-3-carboxamides.

US 5,752,529 discloses injecting solutions of coolant compounds, such as monomethylsuccinate or salts thereof, in triacetine into the filters of cigarettes. This document also discloses applying such solutions to filter tipping paper of cigarettes. This document discloses that secondary coolant compounds may be used in addition to monomethylsuccinate or salts thereof.

The present invention seeks to provide improved taste perception and cooling effect in smoking articles.

Present Invention

In one broad aspect, the present invention provides a tipping paper comprising a coolant composition comprising at least one coolant compound and a carrier and/or solvent for the coolant compound.

The coolant compound may be one or more coolant compounds.

The carrier and/or solvent may be one or more carrier(s) and/or solvent(s).

In a highly preferred aspect, the present invention provides a tipping paper comprising a coolant composition comprising a coolant compound and a nitrocellulosic lacquer.

In another aspect the present invention provides a smoking article comprising a tipping paper comprising a coolant composition comprising a coolant compound and a nitrocellulosic lacquer.

In another aspect, the present invention provides a process for the production of tipping paper of the present invention, comprising contacting the tipping paper with a coolant composition comprising a coolant compound and a nitrocellulosic lacquer.

In one embodiment of the process, layering of lacquers and cooling compounds takes place. Without wishing to be bound by theory, the layering helps prevent migration into the filter / tobacco column of the coolant compound, as well as of other materials that may be present in the coolant composition (such as moisturising agents).

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In one aspect of the process, pre-printed tipping paper is used that has a coolant carrier and/or solvent (preferably a lacquer coating) either underneath the tipping paper (i.e. on the wire side) next to the filter or on the felt side (i.e. on the outside of the tipping paper/portion that is in contact with the lips). Then the pre-printed tipping paper is contacted with the cooling composition of the present invention (preferably the composition comprises the coolant compound and a nitrocellulosic lacquer as the carrier and/or solvent).

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Other options include preparing a multi-layer of lacquer underneath the cooling layer or a layer of lacquer on top of the cooling layer before addition of the cooling composition of the present invention.

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We have found for some aspects that preferably the cooling material stays on the surface of the tipping papers better when using the pre-printed base paper than without the pre-printing step.

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Thus, in one aspect, the present invention provides a smoking article comprising a tipping paper comprising a coolant composition comprising a coolant compound and a solvent and/or carrier (preferably a lacquer, more preferably a nitrocellulosic lacquer); wherein the tipping paper had been pre-treated with a solvent and/or carrier (preferably a lacquer).

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In another aspect, the present invention provides a process for the production of tipping paper of the present invention, comprising (a) contacting tipping paper with a solvent and/or carrier to form a pre-printed tipping paper; and (b) contacting the pre-printed tipping paper with a coolant composition comprising a coolant compound and a solvent and/or carrier (preferably a lacquer, more preferably a nitrocellulosic lacquer).

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Coolant Compounds

Any suitable coolant compounds may be used.

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Typical physiological cooling compounds include polyols exhibiting a negative heat of solution, including xylitol, erythritol, dextrose, and sorbitol, and combinations of at least two of the foregoing; menthyl-group containing cooling agents such as p-menthane, menthone, menthone ketals including menthone glycerol ketals, menthyl alcohols including menthol (2-isopropyl-5-methylcyclohexanol), L-menthol and its natural and synthetic derivatives, (-)-10 (1R,3R,4S)-3-p-menthanol, (-)-(1R,3R,4S)-8-p-menthen-3-ol, menthane diols including p-menthane-2,3-diol and p-menthane-3,8-diol, menthol glyceryl ether, menthoxyalkane alcohols, 6-isopropyl-9-methyl-1,4-dioxaspiro[4,5]decane-2-methanol, 3-(1-menthoxy)ethan-1-ol, 3-(1-menthoxy)propan-1-ol, 3-(1-menthoxy)butan-1-ol, menthoxyalkane diols, 3-(1-15 menthoxy)propane-1,2-diol (e.g., from Takasago, FEMA 3784), 3-(1-menthoxy)-2-methylpropane-1,2-diol, WS-30, p-menthane-3-carboxylic acid glycerol ester, menthol methyl ether, menthyl esters of aliphatic and aromatic monocarboxylic acids, menthyl acetate, menthyl lactate (e.g., from Haarman & Reimer, FEMA 3748, tradename FRESCOLAT® type ML), menthyl 3-hydroxybutyrate, menthyl 4-hydroxypentanoate, menthyl salicylate, menthyl 20 pyrrolidone carboxylate (trade name QUESTICE), monomenthyl esters of aliphatic dicarboxylic acids, monomenthyl glutarate, monomenthyl succinate, alkali metal salts and alkaline earth metal salts of the foregoing, hydroxymethyl and hydroxyethyl derivatives of p-menthane, p-menthane carboxamides, N-aryl menthane carboxamides, N-ethyl-p-menthane-3-carboxamide (WS-3), 1-menthylacetic acid N-ethylamide, N,N-dimethyl menthyl 25 succinamide, N-tert-butyl-p-menthane-3-carboxamide (WS-14), ethyl 3-(p-menthane-3-carboxamido)acetate (also known as WS-5; ethyl ester of N-[[5-methyl-2-(1-methylethyl)cyclohexyl]carbonyl]glycine, CAS Reg. No. 39668-74-1), menthol glycol carbonates, menthol ethyleneglycol carbonate, menthol propyleneglycol carbonate; substituted cyclohexane alcohols, trimethylcyclohexanol, isopulegol; cyclohexane 30 carboxamides, N-methyl-2-isopropyl-bicyclo(2.2.1)heptane-2-carboxamide; acyclic carboxamides, N,2,3-trimethyl-2-isopropyl butanamide (WS-23), N-ethyl-trans-2-cis-6-nonadienamide; 1-methyl-cyclohexanecarboxylic acid (3-methoxy-phenyl)-amide, 1-methyl-cyclohexanecarboxylic acid (4-cyano-phenyl)-amide, 2-methyl-bicyclo[2.2.1]hept-5-ene-2-carboxylic acid (4-cyano-phenyl)-amide, 2-methyl-bicyclo[2.2.1]hept-5-ene-2-carboxylic acid

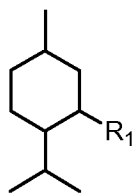
(4-methoxy-phenyl)-amide, 3-isopropyl-1-methyl-cyclopentanecarboxylic acid (4-methoxy-phenyl)-amide, 3-isopropyl-1-methyl-cyclopentanecarboxylic acid (3-cyano-phenyl)-amide, adamantane-1-carboxylic acid (4-methoxy-phenyl)-amide, 2-tert-butyl-cyclopentanecarboxylic acid (4-methoxy-phenyl)-amide, 2-tert-butyl-cyclohexanecarboxylic acid (2-methoxy-phenyl)-amide, 2-tert-butyl-cyclopentanecarboxylic acid (4-hydroxymethyl-phenyl)-amide, 2-tert-butyl-cyclopentanecarboxylic acid (4-acetyl-phenyl)-amide, 2-tert-butyl-cyclopentanecarboxylic acid (4-cyano-phenyl)-amide, 2-tert-butyl-cyclohexanecarboxylic acid (4-hydroxymethyl-phenyl)-amide, 2-tert-butyl-cyclohexanecarboxylic acid (4-acetyl-phenyl)-amide, and 2-tert-butyl-cyclohexanecarboxylic acid (4-cyano-phenyl)-amide; thienopyrimidine cooling agents; substituted ureas and sulfonamides; 2-mercapto-cyclodecanone; hydroxycarboxylic acids with 2-6 carbon atoms; plant extracts including Japanese mint oil, peppermint oil, and eucalyptus extract; substituted derivatives of the foregoing; and combinations of at least two of the foregoing. These and other suitable cooling compounds are further described in U.S. Pat. Nos. 4,136,163 and 4,150,052 and 4,178,459 and 4,190,643 and 4,193,936 and 4,226,988 to Watson et al., U.S. Pat. Nos. 4,230,688 and 4,032,661 and 4,153,679 and 4,296,255 to Rowsell et al., U.S. Pat. No. 4,459,425 to Amano et al., U.S. Pat. No. 5,009,893 to Cheruki et al., U.S. Pat. No. 5,266,592 to Grub et al., U.S. Pat. No. 5,698,181 to Luo, U.S. Pat. Nos. 5,725,865 and 5,843,466 to Mane et al., U.S. Pat. No. 6,231,900 to Hanke, U.S. Pat. No. 6,277,385 to Luke, U.S. Pat. Nos. 6,280,762 and 6,306,429 and 6,432,441 to Bealin Kelly et al., U.S. Pat. Nos. 6,455,080 and 6,627,233 and 7,078,066 to Wolf et al., U.S. Pat. No. 6,783,783 to Clark et al., U.S. Pat. No. 6,884,906 to Dewis et al., U.S. Pat. No. 7,030,273 to Sun, and U.S. Pat. No. 7,090,832 to Zanone et al.; U.S. patent application Publication Nos. U.S. 2004/0175489 of Clark et al., U.S. 2004/0191402 of Stawski et al., U.S. 2005/0019445 of Wolf et al., U.S. 2005/0222256 and U.S. 2005/0265930 of Erman et al., U.S. 2006/0159819 of Witkewitz et al., and U.S. 2006/0249167 of Giersch et al.; European Patent Application No. EP 1689256 A1 of Shimizu et al.; and International Patent Application Nos. WO 2005/082154 A1 of Johnson et al., WO 2005/099473 A1 of Vanrietvelde et al., WO 2006/058600 A1 of Foster et al., WO 2006/092076 A2 of Galopin et al., and WO 2006/125334 A1 of Bell et al. In some embodiments, the composition excludes one or more of the foregoing cooling compounds.

In some embodiments, the cooling compound is a menthyl-based coolant. A menthyl-based coolant is a cooling compound comprising a methyl group. Menthyl-based coolants include menthol and menthol derivatives. Menthol (also known as 2-(2-propyl)-5-methyl-1-

cyclohexanol) is available in artificial form, or naturally from sources such as peppermint oil. Menthol derivatives include menthyl ester-based and menthyl carboxamide-based cooling compounds such as menthyl carboxamide, N-ethyl-p-menthane carboxamide, monomenthyl succinate, monomenthyl- α , monomenthyl methyl succinate, monomenthyl glutarate, menthyl 2-pyrrolidone-5-carboxylate, monomenthyl 3-methyl maleate, menthyl acetate, menthyl lactate, menthyl salicylate, 2-isopropanyl-5-methylcyclohexanol, 3,1-menthoxypropane 1,2-diol, menthane, menthone, menthone ketals, menthone glycerol ketals, menthyl glutarate esters, or a combination of at least two of the foregoing. A specific exemplary coolant is N-ethyl-p-menthane-3-carboxamide, commercially available as WS-3.

The coolant compound may be selected from (i) menthol, menthyl lactate, erythritol, xylitol;

(ii) 3-substituted-p-menthanes of the formula:



wherein R_1 is (i) $-\text{CONR}_2\text{R}_3$; or (ii) $-\text{CO}_2\text{R}_4$;

wherein R_2 when taken separately is hydrogen or an aliphatic group containing up to 25 carbon atoms;

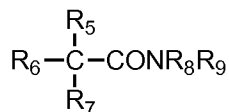
wherein R_3 when taken separately is hydrogen, hydroxy, or an aliphatic carbon containing up to 25 carbon atoms;

with the proviso that when R_2 is hydrogen R_3 may be an aryl group of up to 10 carbon atoms and selected from the group consisting of substituted phenyl, phenalkyl or substituted phenalkyl, naphthyl and substituted naphthyl, pyridyl; and R_2 and R_3 when taken together with the nitrogen atom to which they are attached, represent a cyclic or heterocyclic group of up to 25 carbon atoms;

wherein R_4 is hydrogen; an alkali or alkaline earth metal atom, or an ammonium or substituted ammonium group; or a group containing from 2 to 10 carbon atoms and selected

from hydroxyaliphatic groups having a hydroxyl substituent in a 2- or 3-position and a hydrogen atom in the 1-position; an alkylene oxide containing from 1 to 4 carbon atoms adduct of such a hydroxyaliphatic group; a ketal derivative of such a hydroxyaliphatic group with a ketone containing from 1 to 4 carbon atoms; an acyl containing from 1 to 4 carbon atoms derivative of such a hydroxyaliphatic group; a hydroxyaryl group having a hydroxyl substituent in a 2- or 3-position relative to the ester grouping; a carboxyaliphatic group having a carboxyl group in a 1-, 2- or 3- position; an alkali metal, an alkaline earth metal, ammonium or substituted ammonium salt of such a carboxyaliphatic radical; or an alkyl ester containing from 1 to 4 carbon atoms of such a carboxyaliphatic radical;

(iii) acyclic tertiary and secondary carboximides of the formula:



wherein R₅ is hydrogen or C₁-C₅ alkyl; and

R₆ and R₇ are each C₁-C₅ alkyl; with the provisos that

(i) R₅, R₆ and R₇ together provide a total of at least 5 carbon atoms; and

(ii) when R₅ is hydrogen, R₆ is C₂-C₅ alkyl and R₇ is C₂-C₅ alkyl and at least one of R₆ and R₇ is branched;

wherein R₈ and R₉ when taken separately, are each hydrogen, C₁-C₅ alkyl or C₁-C₈ hydroxyalkyl and provide a total of no more than 8 carbon atoms, with the proviso that when R₈ is hydrogen R₉ may also be alkylcarboxyalkyl of up to 6 carbon atoms; R₈ and R₉, when taken together, represent an alkylene group of up to 6 carbon atoms, the opposite ends of which group are attached to the amide nitrogen atom thereby to form a nitrogen heterocycle, the carbon chain of which may optionally be interrupted by oxygen;

and mixtures thereof.

In the above definitions "aliphatic" is intended to include any straight-chained, branched-chained or cyclic group free or aromatic unsaturation, and thus embraces alkyl, cycloalkyl, alkenyl, cycloalkenyl, alkynyl, hydroxyalkyl, acyloxyalkyl, alkoxy, alkoxyalkyl, aminoalkyl, acylaminoalkyl, carboxyalkyl and similar combinations.

Typical values for R_2 and R_3 when aliphatic are methyl, ethyl, propyl, butyl, isobutyl, n-decyl, cyclo-propyl, cyclohexyl, cyclopentyl, cycloheptylmethyl, 2-hydroxyethyl, 3-hydroxy-n-propyl, 6-hydroxy-n-hexyl, 2-aminoethyl, 2-acetoxyethyl, 2-ethylcarboxyethyl, 4-hydroxybut-2-ynyl, carboxymethyl etc.

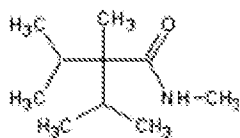
When R_3 is aryl typical values are benzyl, naphthyl, 4-methoxyphenyl, 4-hydroxyphenyl, 4-methylphenyl, 3-hydroxy-4-methylphenyl, 4-fluorophenyl, 4-nitrophenyl, 2-hydroxynaphthyl, pyridyl, etc.

Typical values when R_4 is an alkylene oxide adduct of such a hydroxyaliphatic group are ethylene oxide and propylene oxide; or when R_4 is a ketal derivative of such a hydroxyaliphatic radical with a ketone is acetone; or when R_4 is an alkyl ester of such a carboxyaliphatic radical are methyl and ethyl esters.

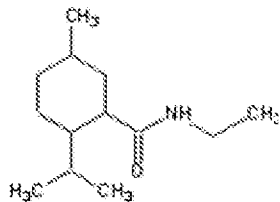
Typical alkali metal atoms are Na, K. Typical alkaline earth metal atom are Ca, Mg. Typical substituted ammonium groups are trimethylammonium, β -hydroxyethylammonium

Preferably, the coolant compound may be selected from menthol; menthyl lactate; erythritol; xylitol; 2-isopropyl-N,2,3-trimethylbutyramide; N-Ethyl-p-menthane-3-carboxamide; Ethyl 3-(p-methane-3-carboxamido)-acetate; N-(4-methoxyphenyl)-p-menthane-3-carboxamide; and mixtures thereof.

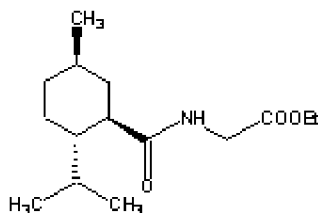
The chemical formula of 2-isopropyl-N,2,3-trimethylbutyramide (WS-23) is:



The chemical formula of N-Ethyl-p-menthane-3-carboxamide (WS-3) is:



5 The chemical formula of Ethyl 3-(p-menthane-3-carboxamido)acetate (WS-5) is:



Carrier and/or Solvent for the Coolant Compound

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Any suitable carrier and/or solvent may be used for the coolant compound.

Examples of suitable carrier and/or solvent include lacquers, such as cellulosic lacquers, or organic solvents such as alcohols (such as ethanol).

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Preferably, the suitable carrier and/or solvent is a cellulosic lacquer, in particular a nitrocellulosic lacquer.

Coolant Composition

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Typically, the proportions of coolant compound to solvent/carrier (preferably cellulosic laquer, more preferably a nitrocellulosic lacquer) ranges from 0.2% coolant 99.8% lacquer to 75% coolant 25% lacquer for a 0.1-10mg smoking article. Preferably, there is 1% coolant 99% lacquer to 36% coolant 64% lacquer. Preferably, there is 3% coolant 97% lacquer to 18% coolant 82% lacquer. Preferably, there is 6.5% cooling 93.5% lacquer to 14.5% cooling 85.5% lacquer.

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Other materials may be added to the coolant composition - such as moisturising compounds e.g. Aloe vera, jojoba oil, Iso propyl palmitate etc.

Tipping paper

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For the purposes of the present invention, the term tipping paper refers to a wrapping material which may be made of paper or, alternatively, may be made of a non-paper material. For example, the tipping paper may be made of a non-paper wrapping material such as those described in International Patent Applications, Publications Nos. WO 96/07336 (the contents of which are incorporated herein by reference) and WO 01/41590 (the contents of which are incorporated herein by reference).

The tipping paper may suitably be a paper wrapper or a substantially non-combustible wrapper, such as that described in WO 96/07336. The subject matter of that application as it relates to the substantially non-combustible wrapper is incorporated herein by reference. The wrapper thereof advantageously contains at least 65% inorganic particulate filler material, such as those inorganic materials described above.

A conventional cellulose pulp paper wrapper may have a permeability in the range 2-300 CU and preferably less than 100 CU. Such a wrapper may also be a low total filler paper such as disclosed in European Patent Application No. 0404580 (the contents of which are incorporated herein by reference) and comprising less than 14% magnesium oxide or hydroxide, for example.

The tipping paper may be a ventilating or a non-ventilating paper.

Smoking Article

Preferably, the smoking article comprises tipping paper comprising from 0.1 mg/smoking article to 10 mg/smoking article of the coolant compound.

Preferably, the smoking article comprises tipping paper comprising from 0.2 mg/smoking article to 5 mg/smoking article of the coolant compound.

Preferably, the smoking article comprises tipping paper comprising from 0.5 mg/smoking article to 2.5 mg/smoking article of the coolant compound.

5 Preferably, the smoking article comprises tipping paper comprising from 1 mg/smoking article to 2 mg/smoking article of the coolant compound.

10 In another aspect, the smoking article comprises tipping paper comprising from 1 mg/smoking article to 2.5 mg/smoking article of 2-isopropyl-N,2,3-trimethylbutyramide (WS-23).

In another aspect, the smoking article comprises tipping paper comprising from 1 mg/smoking article to 2 mg/ smoking article of N-ethyl-p-menthane-3-carboxamide (WS-3).

15 In another aspect, the smoking article comprises tipping paper comprising from 1 mg/smoking article to 2.0 mg/ smoking article of ethyl 3-(p-menthane-3-carboxamido)acetate (WS-5).

20 In another aspect, the smoking article comprises tipping paper comprising from 0.2 mg/smoking article to 1.0 mg/ smoking article of menthyl lactate. The smoking article may comprise tipping paper comprising from 0.3 mg/smoking article to 0.7 mg/ smoking article of menthyl lactate. The smoking article may comprise tipping paper comprising about 0.5 mg/smoking article of menthyl lactate.

25 In another aspect, there is provided a smoking article comprising a wrapped smoking material attached to a filter by tipping paper according to the present invention.

In another aspect, there is provided a smoking article comprising:
a smoking rod comprising a smoking material wrapped in a wrapper;
a filter wrapped in a plug wrap and abutting the smoking rod; and
30 a tipping paper which circumscribes at least the sections of the smoking rod and the filter where they abut against each other;
wherein the tipping paper is a tipping paper according to the present invention.

The smoking material may be any suitable smoking material. For example, the smoking material may be tobacco.

Descriptions of smoking articles, such as cigarettes, and the various components thereof are set forth Tobacco Production, Chemistry and Technology, Davis et al. (Eds.) 1999. Various properties of paper materials used for cigarette manufacture, and of the cigarettes manufactured using those papers, are set forth in Durocher, TJI, 188-194 (3/1985).

Production

Suitably the coolant composition is applied to the tipping paper using any suitable technique, such as techniques well known in the art, such as size press techniques or printing techniques. Surface sizing is a technique used to apply a coating to a paper web. The size press is located past the pre-drying section of a paper making machine. After addition of the surface size i.e. the coating, the web is dried. The size press unit consists of two rotating rollers with a sizing agent pool between them. The paper web is routed through the pool to the nip roller where the size is pressed to the web. Good penetration of the sizing agent is achieved into the paper and the speed of the press does not exceed 1000m/min. There are four commonly known printing techniques: Gravure, offset lithographic, flexographic and Digital Printing. For some embodiments, the printing technique is preferably Gravure.

Examples

Example 1

WS-3 coated onto the filter tipping paper of mentholated cigarettes.

A coated tipping paper was produced using a 36gsm white tipping base paper and a solution of 10% WS-3 90% nitrocellulosic lacquer printed onto the paper. The tipping paper was then dried and reeled into bobbins. The tipping paper was then used in the manufacture of a cigarette which included 5% menthol on the blend. The tipping paper was made to produce a cooling sensation on the lips when the cigarette was smoked.

Analysis of the tipping paper gave an initial value of 1.4mgs WS-3 per cigarette.

Upon placing the cigarette in the smokers lips a refreshing, cooling sensation was detected within 10 seconds and some smokers described this as a tingling sensation. Upon lighting the cigarette and holding the cigarette in-between the lips for a longer period of time a stronger ‘tingling / cooling’ sensation was detected. The sensation tended to build during the smoking of the cigarette. The sensation lasted for about 15minutes after the cigarette was smoked and the cooling sensation increased if the smoker breathed in through the mouth rather than through the nose.

Example 2

WS-23 coated onto a ‘nitrocellulosic lacquered’ tipping paper.

A coated tipping paper was produced using a 36gsm white tipping base paper which has already been coated with a lip release material nitrocellulosic lacquer on the outside of the tipping paper and then a solution of 8% WS-23 92% nitrocellulosic lacquer printed onto the paper to produce a multilayered paper. (Base paper – nitrocellulosic lacquer – WS-23 / nitrocellulosic lacquer.) The tipping paper was then dried and reeled into bobbins.

A small portion of the paper was placed onto the lips of several subjects and the time to detect a sensation i.e. the response and the level of cooling / tingle’ was recorded. This was compared to the tipping paper produced 6 months earlier as described in Example 1 but made with WS-23 instead of WS-3.

Analysis of the papers gave the following values:

Original WS-3 tipping paper (as described in Example 1 - 6 months old)	0.3mg / cigarette
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New multilayer WS-23 tipping paper	1.1mg / cigarette
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A ‘cooling / tingling’ sensation was detected after 2-3 seconds and was described as much stronger than the tipping paper produced in example 1 with WS-3. The sensation lasted for approximately 30 minutes after removal of the tipping paper from the lips.

Example 3

WS-3 and iso propyl palmitate coated onto a tipping paper.

- 5 A coated tipping paper was produced using a 36gsm white tipping base paper and then a solution of 5% WS-3 and 6.5% iso propyl palmitate and 88.5% nitrocellulosic lacquer in a one step process. The tipping paper was then dried and assessed for smoothness and cooling sensation.

10 **Example 4**

WS-3 coated onto a tipping paper.

- A coated tipping paper was produced using a 36gsm white tipping base paper and a solution of 8% WS-3 92% nitrocellulosic lacquer printed onto the paper. (Base paper – WS-3/nitrocellulosic lacquer.)
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Example 5

WS-3 coated onto a tipping paper and overlaid with nitrocellulosic lacquer.

- 20 A coated tipping paper was produced using a 36gsm white tipping base paper and a solution of 8% WS-3 92% nitrocellulosic lacquer printed onto the paper. The coated tipping paper was then coated with a further layer of nitrocellulosic lacquer. (Base paper – WS-3/nitrocellulosic lacquer – nitrocellulosic lacquer.)

25 **Example 6**

WS-3 coated onto a tipping paper having an inner-coating of nitrocellulosic lacquer.

- A coated tipping paper was produced using a 36gsm white tipping base paper which had already been coated with a nitrocellulosic lacquer on the inside of the tipping paper and then a solution of 8% WS-3 92% Nitrocellulosic lacquer printed onto the outside of the paper to produce a multilayered paper. (Nitrocellulosic lacquer (inside) - Base paper – WS-3/nitrocellulosic lacquer.)
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Example 7

WS-3 coated onto a 'nitrocellulosic lacquered' tipping paper.

- 5 A coated tipping paper was produced using a 36gsm white tipping base paper which had already been coated with a nitrocellulosic lacquer on the outside of the tipping paper and then a solution of 8% WS-3 92% nitrocellulosic lacquer printed onto the paper to produce a multilayered paper. (Base paper – nitrocellulosic lacquer – WS-3 / nitrocellulosic lacquer.)

10 **Example 8**

WS-3 coated onto a 'nitrocellulosic lacquered' tipping paper and overlaid with nitrocellulosic lacquer.

- 15 A coated tipping paper was produced using a 36gsm white tipping base paper which had already been coated with a nitrocellulosic lacquer on the outside of the tipping paper and then a solution of 8% WS-3 92% nitrocellulosic lacquer printed onto the paper. The coated tipping paper was then coated with a further layer of nitrocellulosic lacquer to produce a multilayered paper. (Base paper – nitrocellulosic lacquer – WS-3 / nitrocellulosic lacquer – nitrocellulosic lacquer.)

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Example 9

WS-3 coated onto a calendered tipping paper

- 25 A coated tipping paper was produced using a 36gsm white tipping base paper that had been calendered to give it a smoother finish and a solution of 8% WS-3 92% nitrocellulosic lacquer printed onto the paper. (Base paper (smoother) – WS-3 / nitrocellulosic lacquer.)

Example 10

WS-3 coated onto a calendered tipping paper and overlaid with nitrocellulosic lacquer

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- A coated tipping paper was produced using a 36gsm white tipping base paper that has been calendered to give it a smoother finish and a solution of 8% WS-3 92% nitrocellulosic lacquer printed onto the paper. The coated tipping paper was then coated with a further layer of

nitrocellulosic lacquer to produce a multilayered paper. (Base paper (smoother) – WS-3 / nitrocellulosic lacquer – nitrocellulosic lacquer.)

Example 11

- 5 WS-3 coated onto a calendered tipping paper having an inner coating of nitrocellulosic lacquer.

A coated tipping paper was produced using a 36gsm white tipping base paper that had been calendered to give it a smoother finish and which has already been coated with a
10 nitrocellulosic lacquer on the inside of the tipping paper and a solution of 8% WS-3 92% Nitrocellulosic lacquer printed onto the paper to produce a multilayered paper. (Nitrocellulosic lacquer (inside) – Base paper (smoother) – WS-3 / nitrocellulosic lacquer.)

All publications mentioned in the above specification are herein incorporated by reference. Various modifications and variations of the described methods and system of the present invention will be apparent to those skilled in the art without departing from the scope of the present invention. Although the present invention has been described in connection with specific preferred embodiments, it should be understood that the invention as claimed should not be unduly limited to such specific embodiments. Indeed, various modifications of the described modes for carrying out the invention which are obvious to those skilled in the art intended to be within the scope of the following claims.

CLAIMS

1. A tipping paper comprising a coolant composition comprising a coolant compound and a nitrocellulosic lacquer.

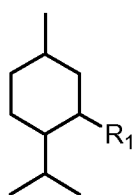
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2. A tipping paper according to claim 1 wherein the coolant compound is selected from

(i) menthol, menthyl lactate, erythritol, xylitol;

(ii) 3-substituted-p-menthanes of the formula:

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wherein R_1 is (i) $-\text{CONR}_2\text{R}_3$; or (ii) $-\text{CO}_2\text{R}_4$;

wherein R_2 when taken separately is hydrogen or an aliphatic group containing up to 25 carbon atoms;

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wherein R_3 when taken separately is hydrogen, hydroxy, or an aliphatic carbon containing up to 25 carbon atoms;

20 with the proviso that when R_2 is hydrogen R_3 may be an aryl group of up to 10 carbon atoms and selected from the group consisting of substituted phenyl, phenalkyl or substituted phenalkyl, naphthyl and substituted naphthyl, pyridyl; and R_2 and R_3 when taken together with the nitrogen atom to which they are attached, represent a cyclic or heterocyclic group of up to 25 carbon atoms;

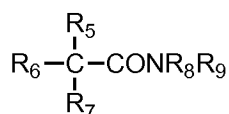
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wherein R_4 is hydrogen; an alkali or alkaline earth metal atom, or an ammonium or substituted ammonium group; or a group containing from 2 to 10 carbon atoms and selected from hydroxyaliphatic groups having a hydroxyl substituent in a 2- or 3-position and a hydrogen atom in the 1-position; an alkylene oxide containing from 1 to 4 carbon atoms adduct of such a hydroxyaliphatic group; a ketal derivative of such a hydroxyaliphatic group with a ketone containing from 1 to 4 carbon atoms; an acyl containing from 1 to 4 carbon

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atoms derivative of such a hydroxyaliphatic group; a hydroxyaryl group having a hydroxyl substituent in a 2- or 3-position relative to the ester grouping; a carboxyaliphatic group having a carboxyl group in a 1-, 2- or 3- position; an alkali metal, an alkaline earth metal, ammonium or substituted ammonium salt of such a carboxyaliphatic radical; or an alkyl ester containing from 1 to 4 carbon atoms of such a carboxyaliphatic radical;

(iii) acyclic tertiary and secondary carboximides of the formula:



wherein R₅ is hydrogen or C₁-C₅ alkyl; and

R₆ and R₇ are each C₁-C₅ alkyl; with the provisos that

(i) R₅ R₆ and R₇ together provide a total of at least 5 carbon atoms; and

(ii) when R₅ is hydrogen, R₆ is C₂-C₅ alkyl and R₇ is C₂-C₅ alkyl and at least one of R₆ and R₇ is branched;

wherein R₈ and R₉ when taken separately, are each hydrogen, C₁-C₅ alkyl or C₁-C₈ hydroxyalkyl and provide a total of no more than 8 carbon atoms, with the proviso that when R₈ is hydrogen R₉ may also be alkylcarboxyalkyl of up to 6 carbon atoms; R₈ and R₉, when taken together, represent an alkylene group of up to 6 carbon atoms, the opposite ends of which group are attached to the amide nitrogen atom thereby to form a nitrogen heterocycle, the carbon chain of which may optionally be interrupted by oxygen;

and mixtures thereof.

3. A tipping paper according to claim 1 or 2 wherein the coolant is selected from menthol; menthyl lactate; erythritol; xylitol; 2-isopropyl-N,2,3-trimethylbutyramide; N-Ethyl-p-menthane-3-carboxamide; Ethyl 3-(p-methane-3-carboxamido)-acetate; N-(4-methoxyphenyl)-p-menthane-3-carboxamide; and mixtures thereof.

4. A smoking article comprising a tipping paper according to any one of claims 1 to 3.

5. A smoking article according to claim 4 wherein the tipping paper comprises from 0.1 mg/smoking article to 10 mg/smoking article of the coolant compound.

6. A smoking article according to claim 4 or 5, wherein the tipping paper comprises from 0.5 mg/smoking article to 2.5 mg/smoking article of the coolant compound.

7. A process for the production of tipping paper according to any one of claims 1 to 3, comprising contacting the tipping paper with a coolant composition comprising a coolant compound and a nitrocellulosic lacquer.

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8. A tipping paper comprising a coolant composition comprising at least one coolant compound and a carrier and/or solvent for the coolant compound.

9. A smoking article comprising a tipping paper comprising a coolant composition comprising a coolant compound and a solvent and/or carrier; wherein the tipping paper had been pre-treated with a solvent and/or carrier.

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10. A process comprising (a) contacting tipping paper with a solvent and/or carrier to form a pre-printed tipping paper; and (b) contacting the pre-printed tipping paper with a coolant composition comprising a coolant compound and a solvent and/or carrier.

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