

A METHOD OF MARKING CIGARETTE PAPER

The present invention relates to marking paper for wrapping a cigarette.

Various types of cigarette paper marking are known.

5 Thus, proposals have been made to mark cigarette paper using a composition which changes color at a selected temperature in order to provide the smoker with an indication concerning temperature distribution along a cigarette.

10 More generally, present cigarettes often have cigarette paper marked with patterns that are characteristic of the origin or the brand of the cigarette. Such patterns are generally printed using ink, and sometimes they are made as water marks. By way
15 of example, they may represent the name of the cigarette manufacturer written in special lettering, or they may represent specific patterns, and in particular patterns that are particularly fine and complex.

The main object of such marking is to give a
20 specific appearance to a cigarette of a given brand.

Another object of such marking is to guarantee the origin of the cigarette. Large quantities of cigarettes are to be found on the market that are sold in
unauthorized manner in packs that are identical to the
25 packs of well-known cigarettes. Such cigarettes are often made of tobacco of lower quality.

The characteristic marking used at present seeks to be quite difficult to reproduce because of its fineness or complexity. Thus, non-authorized cigarette
30 manufacturers do not always take the trouble to reproduce such marking, such that a purchaser of cigarettes can, on opening a cigarette pack, observe that the cigarettes are not marked in characteristic manner, and thus that they are not authentic.

35 Such a purchaser may be a cigarette smoker, a wholesaler, or a retailer.

It is rare that present marking of cigarette paper achieves the latter aim.

Since printing techniques have improved, unauthorized manufacturers of cigarette paper, even when
5 of limited technical means, are finding it easier and easier to reproduce known types of markings in identical manner so that nowadays cigarettes that are not authentic often have paper that is marked in the same manner as authentic cigarettes.

10 In addition, good quality cigarette papers are nowadays treated with complex chemical compositions to impart highly specific smoking characteristics thereto.

The inventors have observed that cigarette manufacturers ordering such finely prepared papers are
15 victims of misappropriation of a fraction of the batches of cigarette paper intended for them. The people stealing such batches of high quality paper replace them with batches of lower quality paper.

The counterfeit paper nevertheless includes the
20 above-mentioned authentication marking, since the counterfeiters know how to reproduce it, such that cigarette manufacturers and purchasers of the paper have no easily-available means for distinguishing authentic paper from counterfeit paper, and thus for verifying the
25 origin of the paper delivered to them.

The invention proposes to remedy these various drawbacks.

Thus, an object of the invention is to provide a novel type of cigarette paper marking which is more
30 difficult to copy.

A second object of the invention is to provide a novel type of cigarette paper marking which enables a cigarette paper purchaser to verify effectively and easily the authenticity of paper that has been delivered.

35 A third object is to provide a novel type of cigarette paper marking enabling a cigarette paper manufacturer to verify, more specifically, that the paper

which has been delivered is not paper that has been substituted for some other paper that was initially ordered.

5 A fourth object of the invention is to propose a novel type of cigarette paper marking which enables a cigarette purchaser to verify more reliably the authenticity of cigarettes that have been purchased.

10 These objects are achieved by a method of marking paper for wrapping the tobacco of a cigarette in order to enable the authenticity of the paper to be verified, in which the paper is marked with an invisible authenticating pattern which is suitable for being revealed only by exposing the paper to an appropriate temperature.

15 Since the pattern is not visible when the paper is in its natural state, the marking is similar to being an intrinsic characteristic of the paper.

20 A paper marked by the method is of appearance similar to traditional paper, and thus marking the invention does not alter in any way the appearance of a cigarette.

25 A method of the invention makes it possible to mark paper without drawing the attention of a person who is not in the know, for example unknown to a counterfeiter or even to a purchaser of the paper.

30 If an unauthorized paper manufacturer is unaware of the existence of such marking, he will not seek to reproduce it. As a result his paper will not reveal its marking when exposed to the appropriate temperature, and it is easily detectable by being exposed to this appropriate temperature.

35 More generally, since such invisible patterns can be changed without altering the appearance of a cigarette, the manufacturer of cigarette paper can change the patterns frequently without disturbing cigarette consumers. The method of the invention thus makes it

possible to mark a cigarette without consumers being aware of the marking.

The manufacturer of the paper can alter the patterns so frequently that paper counterfeiters do not have the means to keep up with alterations which are implemented that often. Paper purchasers in the know can thus verify that the latest alterations are present on paper that is delivered to them, and thus that it has not been replaced by paper of low quality.

By means of such invisible marking, a paper manufacturer can also adopt different patterns for each batch sent to a purchaser.

Advantageously, the manufacturer informs the purchaser of the appearance of the expected pattern, such that counterfeiters, even if they know how to implement such invisible marking, cannot foresee in advance which pattern should be produced.

In dispositions that are advantageous, but not limiting, the method may present one or more of the following characteristics:

- the pattern is made by applying a salt to the paper at different concentrations in the pattern and around the pattern, said salt being selected to be suitable, when the paper is subjected to said appropriate temperature, for giving rise to different degrees of browning, depending on its concentration;

- the concentrations of salt are selected so that said appropriate temperature lies in the range 200°C to 270°C;

- the salt is applied solely in the position of the pattern;

- the salt is applied solely around the pattern;

- the salt is an alkali metal salt;

- the salt is an ammonium phosphate;

- the pattern is small enough for the speed of free combustion and the number of potential puffs from a cigarette wrapped in paper including the pattern to be

the same as for a cigarette wrapped in the same paper but not including the pattern;

• the cigarette paper is made to pass against an element suitable for applying a solution of said salt to the paper, said element being etched in a manner suitable for giving rise to a concentration of solution in the zones of the paper that come into contact with its etching which is different from the constant concentration obtained in the other zones, said etching being selected to constitute the characteristic pattern; and

• the etching is constituted by cavities, and the application pressure is varied to obtain lower or higher concentration in those zones of the paper that come into contact with the etching.

The invention also provides paper for wrapping the tobacco of a cigarette and marked by the method of the invention.

The invention also provides a method of verifying the authenticity of paper for wrapping the tobacco of a cigarette, said paper being marked by the method of the invention, in which method, the paper is exposed to said appropriate temperature.

The invention also provides a method of verifying the authenticity of a cigarette whose tobacco is wrapped in paper marked by the method of the invention, in which method, the cigarette is exposed to said appropriate temperature.

Other characteristics, objects, and advantages of the present invention will appear on reading the following detailed description and with reference to the accompanying drawings given by way of non-limiting example, and in which:

• Figure 1 shows a cigarette whose paper has been marked by the present invention;

• Figure 2 is a diagrammatic cross-section view through apparatus for impregnating cigarette paper with a

salt solution, which apparatus is known and is commonly referred to as using a "dip cylinder";

• Figure 3 is the same view for a known variant of the Figure 2 apparatus in which the solution is sprayed
5 onto the cylinder;

• Figure 4 is a diagrammatic cross-section view of known "size-press" apparatus for impregnating cigarette paper by a dip process;

• Figure 5 is the same view showing a known variant
10 of the above apparatus in which the salt is sprayed onto one of the cylinders;

• Figure 6 is a diagrammatic view of an etched print cylinder of the invention;

• Figure 7 is a fragmentary cross-section of a
15 cylinder of the invention with intaglio etching;

• Figure 8 is a fragmentary cross-section through a cylinder with letterpress etching, constituting a variant of the invention;

• Figure 9 is a fragmentary cross-section through a
20 cylinder used in the known photogravure process;

• Figure 10 is a diagrammatic cross-section view of known apparatus for impregnating cigarette paper by means of felt and dipping;

• Figure 11 shows the same view of a variant of the
25 Figure 10 apparatus in which the salt is sprayed onto the felt; and

• Figure 12 is a fragmentary diagrammatic view of a strip of etched felt, placed on a set of rollers, in accordance with the present invention.

30 A cigarette paper of the invention is described below.

Cigarette paper is generally constituted by cellulose fibers and inorganic fillers, together with a combustion salt that is uniformly distributed through the
35 paper. Such combustion salts are usually alkali metal salts, or chemical agents comprising an ammonium phosphate such as monoammonium phosphate.

A cigarette paper of this composition becomes yellow on being subjected to high temperatures. This phenomenon is commonly referred to as the paper "decomposing" or "aging" when heated.

5 The purpose of combustion salts is to influence the rate of combustion of the paper. They make it possible to increase or decrease the temperature at which cellulose decomposes. In corresponding manner, they alter the temperature at which the paper begins to
10 yellow.

Numerous examples of such combustion salts are to be found in document US 4 461 311 which shows that such salts can also be used to reduce the smoke given off laterally from a cigarette.

15 It can also be seen from that document that some salts behave as combustion accelerators when they are at a low concentration per unit area, i.e. they reduce the temperature at which the paper decomposes when exposed to heat in a range of low concentrations, while they have
20 the opposite effect at high concentrations.

Figure 1 shows a cigarette of the invention comprising a filter 100 and a main portion 200 constituted by tobacco wrapped in a cigarette paper.

In the preferred embodiment of Figure 1, the marking
25 zones 220 are impregnated with combustion salts at a concentration per unit area that is greater than the uniform concentration of other zones. The terms "marking" or "marking zones" are used below for characteristic patterns made on the cigarette paper.
30 With the combustion salt in the concentration ranges used herein, increasing concentration of the salt decreases the temperature at which the paper decomposes on being exposed to heat.

The cigarette shown herein has been subjected in a
35 zone 250, as defined by dashed lines, to temperatures that are high enough to cause a small amount of yellowing

to appear in the ordinary portions of the paper surrounding the markings 220.

The marking zones 220 thus present yellowing that is more pronounced, or even browning, because the decomposition temperature of the paper in these zones is lower than in the ordinary zone. Yellow or brown patterns 220 can thus be seen on paper that is slightly yellow. In the zone 270, a temperature that is high enough to cause yellowing to appear has not yet been achieved, even in the marking zones. The marking therefore remains invisible.

In the particular case of the cigarette of Figure 1, heating of the portion 250 can be obtained by moving it close to the flame of a lighter or to the incandescent portion of another cigarette. Another method consists in heating the cigarette in an oven. In practice, the patterns can be made to show up clearly by subjecting the cigarette to a temperature lying in the range 200°C to 270°C for a period of 5 seconds to 20 seconds.

In a variant of the invention, a chemical agent is used which, at appropriate concentrations, increases the temperature at which the paper decomposes on being exposed to heat, and does so more strongly with increasing concentration per unit area, so that zones with high concentration thus appear as pale patterns on a dark background.

Conversely, the marking zones may be made with combustion salts at a concentration per unit area that is lower than that of the other zones. If the chemical agent increases the decomposition temperature, then they yellow more strongly. If the agent decreases the temperature at which the paper decomposes on being exposed to heat, then they are less yellow in appearance.

In preferred manner, and for common combustion salts such as the salts of alkali metals, salt concentrations are selected lying in the range 1% to 4% by weight in the marking zones and 0 to 2% by weight in the other zones.

A concentration difference of 1% by weight between the marking zones and the other zones makes it possible to obtain marking of acceptable quality.

No chemical additive other than those present in common cigarette papers is required. Nevertheless, any chemical agent which alters the decomposition temperature of cellulose by reducing it or by increasing it can be used to obtain the same invisible marking effect on the paper. If the marking zones are small enough, the higher or lower local concentration in salt has no effect on the combustion characteristics of the paper, and consequently no effect on the smoking characteristics of a cigarette. Thus, the free combustion speed and the number of puffs are maintained, as are the characteristics of appearance while smoking is taking place: the appearance of the ash, black ring.

The invention proposes various advantageous methods of making such cigarette paper.

Figures 2 to 5, and 10 & 11 show known apparatuses used for uniformly impregnating paper with a combustion salt solution.

Such apparatuses can be modified in application of advantageous characteristics of the invention (not shown in the figures) to make the patterns described above.

Figure 2 shows a device for impregnation by means of a cylinder and by dipping. A dipping cylinder 10 is partially immersed in a solution of combustion salts 5. It is rotated about its axis of symmetry 15. Its periphery is in contact with a rotary print roller 20. The print roller 20 is thus impregnated by coming into contact with the cylinder 10. In turn, the print roller 20 impregnates the paper 50 travelling at substantially the same linear speed as the periphery of the roller 20 between the roller 20 and a backing roller 30. The cylinders 20 and 30 are pressed against each other with sufficient pressure to compress the paper 50 and enable it to be impregnated properly and uniformly.

The apparatus of Figure 3 differs from that of Figure 2 only by the fact that the cylinder 10 is not impregnated by dipping into a bath, but by salt solution being sprayed thereon. For this purpose, a spray nozzle 8 and a recovery trough 7 are shown in the figure.

The Figure 4 apparatus is a "size-press" type apparatus of structure similar to that of the Figure 2 apparatus but in a different disposition. The paper travels vertically between the two rollers 20 and 30 whose axes lie in a common horizontal plane.

The apparatus of Figure 5 constitutes a variant of the above apparatus in which the print roller 20 is impregnated by being sprayed in a solution of combustion salts.

By means of these apparatuses, it is possible to impregnate paper so as to obtain a uniform concentration of combustion salts.

An advantageous embodiment of the invention consists in etching the periphery of the roller which comes into contact with the paper and which transports the salt solution. In Figures 2 to 5, this roller is referenced 20.

Such a roller is shown in Figure 6. The etching may be recessed (intaglio) or in relief (letterpress) as shown in Figures 7 and 8 respectively. When the etching is in relief, the method is similar to the flexographic printing techniques used with ink.

A roller 20 provided with etching in relief 22 impregnates only those zones that come into contact with the etching 22.

This principle can thus be used both to mark paper that is initially not impregnated with salt, and also to provide zones of higher concentration on paper that initially has a uniform concentration of salt.

The roller shown in Figure 7 serves, in a single pass of the paper, to impregnate the ordinary zone of the paper with a uniform surface concentration, and to

impregnate the marking zones 220 with a concentration that is different from said uniform concentration.

This different concentration may be greater than or less than the "uniform" concentration. It is the pressure adjustment between the two cylinders between which the paper passes that determines whether the concentration obtained in the zones coming into contact with the etching will be greater than or less than the uniform concentration obtained elsewhere. At high pressure, the etching gives rise to reduced concentration, while at low pressure the etching gives rise to enhanced concentration. The deeper the etching, the greater the ability of the etching to receive fluid, and the greater the excess concentration obtained when operating at low pressure.

Paper of the invention may initially be formed by photogravure as shown in Figure 9. A cylinder 20 having a central tank 24 is connected to hollow etching 22 via channels 23. The salt solution 20 is contained in the tank 24 and can flow into the hollow etching 22 via the channels 23.

The impregnation apparatus shown in Figure 10 uses a strip of felt 20 driven by a set of rollers 10, 12, 14, 40. This apparatus has a trough 5 in its bottom portion which is filled with a combustion salt solution and through which the felt strip 20 passes. In the top portion of the apparatus, the paper 50 and the felt strip 20 travel between two rollers 40 and 30. Between the cylinder 40 and the cylinder 30 sufficient pressure is exerted to compress the paper 50, thus making efficient and uniform impregnation possible. Intermediate rollers 12 and 14 are provided between the rollers 10 and 40.

The apparatus of Figure 11 differs from that of Figure 10 merely by the fact that the felt is impregnated by a device 7 for spraying the combustion salt solution.

A preferred embodiment of the invention consists in making hollow etching in the outside surface of the felt

strip, as shown in Figure 12. This disposition makes it possible in a single pass of the paper to impregnate the ordinary zone with a given uniform concentration per unit area, and to impregnate the marking zones with a different concentration. As with hollow etching formed at the periphery of the roller of Figure 6, the concentration in the zones that come into contact with the hollow etching can be selected to be greater than or less than said uniform concentration as a function of the pressure that is set between the two cylinders 30 and 40 between which the paper 50 and the felt strip 20 pass. At low pressure the etching gives rise to increased concentration, while at low pressure it gives rise to decreased concentration. When using low pressure, the deeper the etching the greater its ability to receive solution, and so the greater the extra concentration that is obtained. As with cylinder impregnation apparatuses, it is possible to use a felt strip including etching that is in relief.

20 Naturally, the invention is not limited to the embodiments described above, but extends to any variant within the spirit thereof.



CLAIMS

- 1/ A method of marking paper for wrapping the tobacco of a cigarette in order to enable the authenticity of the paper to be verified, in which the paper is marked with an invisible authenticating pattern which is suitable for being revealed only by exposing the paper to an appropriate temperature.
- 2/ A method according to claim 1, in which the pattern is made by applying a salt to the paper at different concentrations in the pattern and around the pattern, said salt being selected to be suitable, when the paper is subjected to said appropriate temperature, for giving rise to different degrees of browning, depending on its concentration.
- 3/ A method according to claim 2, characterized in that the concentrations of salt are selected so that said appropriate temperature lies in the range 200°C to 270°C.
- 4/ A method according to claim 2 or 3, in which the salt is applied solely in the position of the pattern.
- 5/ A method according to claim 2 or 3, in which the salt is applied solely around the pattern.
- 6/ A method according to any one of claims 2 to 5, characterized in that the salt is an alkali metal salt.
- 7/ A method according to any one of claims 2 to 5, characterized in that the salt is an ammonium phosphate.
- 8/ A method according to any one of claims 1 to 7, characterized in that the pattern is small enough for the speed of free combustion and the number of potential puffs from a cigarette wrapped in paper including the



pattern to be the same as for a cigarette wrapped in the same paper but not including the pattern.

- 5 9/ A method according to any one of claims 2 to 8, characterized in that the cigarette paper is made to pass against an element suitable for applying a solution of said salt to the paper, said element being etched in a manner suitable for giving rise to a concentration of solution in the zones (220) of the paper (50) that come
10 into contact with its etching (22) which is different from the constant concentration obtained in the other zones, said etching (22) being selected to constitute the characteristic pattern.
- 15 10/ A method according to claim 9, characterized in that the etching (22) is constituted by cavities and in that the application pressure is varied to obtain lower or higher concentration in those zones of the paper (50) that come into contact with the etching (22).
- 20 11/ Paper for wrapping the tobacco of a cigarette, characterized in that it is marked using the method of any one of claims 1 to 10.
- 25 12/ A method of verifying the authenticity of paper for wrapping the tobacco of a cigarette, said paper being according to claim 11; and characterized in that the paper is exposed to said appropriate temperature.
- 30 13/ A method of verifying the authenticity of a cigarette whose tobacco is wrapped in paper according to claim 11, characterized in that the cigarette is exposed to said appropriate temperature.