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(54) Cigarette paper

(57) A cigarette paper (10), e.g. a rolling paper, comprises embossments (16), the paper (10) having a nominal thickness and the paper (10) being thinner than its nominal thickness in the area of the embossments (16). The area of the embossments (16) covers at least 50% of the total area of the cigarette paper (10). In the area of the embossments (16), the opacity of the paper (10) can be in the range of from 0.2 to 0.9.

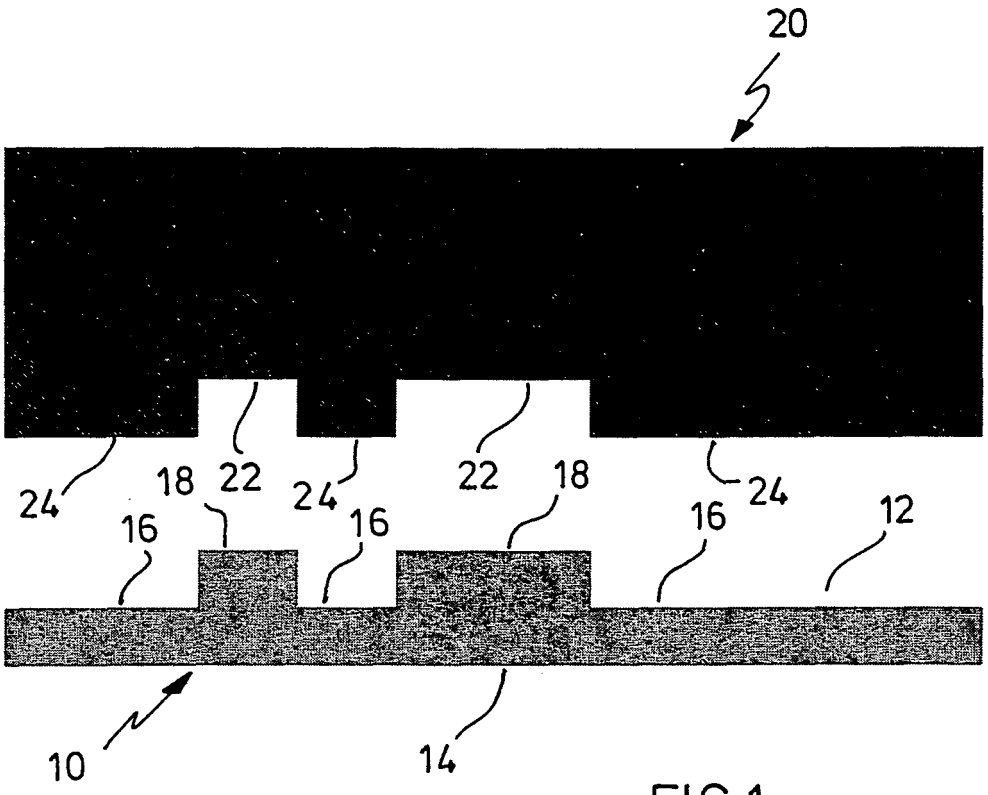

FIG.1

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Description

[0001] The invention relates to a cigarette paper comprising embossments, which is particularly suitable to be used as a rolling paper.

[0002] In the prior art, a significant proportion of the rolling papers has a so-called filigrain (filigree) applied to it. This is a brand or logo (possibly including additional lines) put on the paper during an off-line process. The technique which is traditionally used for surface-marking of rolling papers is called 'filigraining'. In this operation, the paper is passed through an engraved main cylinder (mostly of steel) and a non-engraved counter-cylinder, wherein the desired design or image is formed as a raised structure on the surface of the main cylinder. This design is transferred onto the paper by pressure, i.e. the paper is compressed in the areas of the raised structure. In the compressed zones, the paper has an increased transparency so that the design is visible as an area in the paper which is more transparent or less opaque.

[0003] The optical impact provided by this technique is not very impressive. In particular, with very thin or unfilled papers often used as rolling papers, which naturally comprise a high transparancy, the effect of filigraining is very weak or even invisible. Moreover, the impressed design cannot be detected by touching, i.e. there is no haptic effect. Another disadvantage of the prior art cigarette papers is the difficulty in filigraining more complex or irregular designs, e.g., patterns of natural materials such as fibers, leather, etc.

[0004] The object of the invention is to provide a cigarette paper comprising a more impressive appearance than the prior art papers described above.

[0005] This object is achieved by a cigarette paper having the features of claim 1. Advantageous embodiments of the invention follow from the dependant claims.

[0006] The cigarette paper according to the invention comprises embossments. In the area of the embossments, the paper is thinner than its nominal thickness. The area of the embossments covers at least 50% of the total area of the cigarette paper. In advantageous embodiments, the cigarette paper is a rolling paper.

[0007] Since the relative area of the embossments (engravings) is large, in contrast to the prior art cigarette papers discussed above, any desired design, image, pattern, etc. (in the following: image) on the cigarette paper can be provided by compressing or making thinner the paper in the zones between the lines or comparable structures defining the image in question. In other words, an engraving or embossing cylinder used to prepare the cigarette paper according to the invention can be made as a "negative" of the prior art embossing cylinder described above, i.e. the desired image is formed as depressions on the embossing cylinder. When pressure is applied to such a cylinder whilst paper is passed through the cylinder and a counter-cylinder, the image is transferred onto the paper by forming depressions between the lines or regions of the image. Thus, in the regions of the image, the paper keeps its nominal thickness or essentially keeps it, whereas in the other zones the paper gets compressed or thinner and gets more transparent so that the image is easily visible as a less transparent structure.

[0008] Moreover, the image can be felt when touching the surface of the cigarette paper because the structure of the image is effectively raised above the larger part of the surface of the paper (i.e. the compressed part of the surface), the height difference being typically between 1 μm and 20 μm. This enhances the impact of the image and can, depending on the kind of image structure (e.g., the direction of image lines), also modify the rolling characteristics of the paper by making the paper to bend preferentially in a desired direction.

[0009] The optical and haptical effects explained so far can be more or less pronounced and are influenced, e.g., by the thickness and composition of the paper and by the details of the embossing process.

[0010] In the area of the embossments, the opacity of the paper preferentially is in the range from 0.2 to 0.9. Here the opacity of a body is defined as 1 - T, wherein T is the transmittance of the body for light in the visible frequency range. For a completely translucent body, T = 1, for a completely opaque body, T = 0. Thus, the opacity defined in this way theoretically can vary between 0 and 1, and in general for cigarette paper varies between 0.15 and 1. It is also familiar to indicate the opacity in percent, i.e. 0.15 to 1 corresponds to 15% to 100%.

[0011] In advantageous embodiments of the invention, the cigarette paper can have a nominal thickness in the range of from 15 μm to 30 μm. The nominal thickness is correlated to the weight of the paper, which typically is in the range of from 11 g/m^2 to 27 g/m^2.

[0012] As already mentioned, the total area of the embossments where the paper is thinner than its nominal thickness covers at least 50% of the total area of the cigarette paper, e.g. 50%-55%, 55%-60%, 60%-65%, 65%-70%, 70%-75%, 75%-80%, 80%-85%, 85%-90%, 90%-95% or even more than 95%.

[0013] Between the embossments, the cigarette paper comprises regions in which the paper has its nominal thickness or a thickness close to its nominal thickness. These regions make up the design or image on the cigarette paper, as described above, and can have a width (e.g., as a line width) in the range, e.g., of from 0.1 mm to 5.0 mm. Examples for image types are regular and non-regular patterns (e.g. designed as lines, waves, animal skin, leather, etc.), motifs (e.g. designed as a logo), inscriptions, etc. As already mentioned, the rolling characteristics of the cigarette paper can also be influenced by the form of an image pattern (e.g. designed as a set of lines in parallel to the longitudinal axis of a finished rolled cigarette).

[0014] Preferably, the paper is embossed from one side, e.g., by runing it between an embossing cylinder (on which the desired image is formed by depressions) and a smooth counter-cylinder. It is also conceivable,

however, that the paper is embossed from both sides; for example, the counter-cylinder could be engraved with the same image as the other cylinder, resulting in an effectively raised image structure on both sides of the cigarette paper. Depending on the type of image design and paper, the cylinder and the counter-cylinder can be made of steel, ceramics or other materials (e.g., rubber or synthetic elastic materials). The depth and dimensions of the engravings can be optimised in function of the type of paper, image design and machinery used.

[0015] In the cigarette paper according to the invention, the embossments can be adapted to provide to the cigarette paper a reduced ignition propensity. Product regulations in many countries specify that cigarettes have to fulfil certain safety standards regarding their ignition propensity. The ignition propensity of cigarettes can be measured by a standardised test method. Usually, the test defined in ASTM E 2187-04 is performed (ASTM: "American Standard for Testing and Materials"; ASTM E 2187: "Standard Test Method for Measuring the Ignition Strength of Cigarettes"; the extension "-04" refers to 2004 as the year of the last revision). According to ASTM E 2187-04, a sample of 40 cigarettes is tested under well-defined conditions, and the fraction of these cigarettes which burn their full length is called "the test result". A safety standard specifies which test result is acceptable. For example, in Canada and some U.S. states, the acceptable test result is 25%, i.e. at least 75% of the cigarettes have to extinguish before burning their full length in order to comply with the safety standard. When the paper is embossed in a general dry state, the paper has a higher density in the area of the embossments, which means that in this area the porous volume of the paper is smaller and the access of oxygen to the paper fibres is more difficult. Since the area of the embossments is relatively large, the effect on ignition propensity is significant.

[0016] Another advantage of the cigarette paper according to the invention is that the structure applied on the paper by the embossing process can influence the acoustic behaviour of the paper, e.g. by reducing the noise while the cigarette paper is handled or by providing a sound of the paper that is similar to the sound of handling silk.

[0017] Moreover, the embossments can be designed to increase the friction of the cigarette paper, thereby facilitating the holding of the paper (when the paper is embossed on the outer surface of a finished hand-rolled cigarette) as well as reducing the risk of tobacco falling out from the front end of a hand-rolled cigarette (when the paper is embossed on the inner surface).

[0018] Generally, the cigarette paper according to the invention can be handled and processed in subsequent manufacturing steps like conventional cigarette paper. In particular, rolling paper according to the invention can be submitted to usual treatment steps like gumming, interleaving (making a block, i.e. a pile of papers) and packing (into a booklet format).

[0019] In a method of embossing cigarette paper comprising the features explained so far, the cigarette paper can be prepared in an embossing apparatus, wherein the paper is embossed in a generally dry state. Thus, in the area of the embossments, the density of the paper generally increases, compared to the density in the non-embossed areas, whereas the weight per unit area of the paper essentially remains constant, i.e. essentially keeps its nominal value. In the area of the embossments, the paper fibres tend to be crushed, which generally leads to a decrease in opacity or an increase in transparency of the paper.

[0020] If desired, the embossment steps could be integrated in a gumming or interleaving operation (on-line). To this end, the cigarette paper can be embossed by means of at least one embossing roller of an embossing unit placed in a gumming apparatus or an interleaving apparatus.

[0021] In another version of the cigarette paper according to the invention, in the area of the embossments, the weight per unit area of the paper is smaller than its nominal weight per unit area, preferably smaller by 5% to 50%, related to the nominal weight per unit area. Such cigarette paper can be prepared by embossing the paper in a generally wet state, preferably in a paper machine during a paper making process. When the paper has already been formed and is still very wet, the embossing procedure tends to displace the paper fibres. This results in a generally lower weight per unit area of the paper, compared to its nominal value, and a generally lower opacity or higher transparency, whereas the density of the paper is not influenced much. When the paper is embossed in the wet state, it is possible that, in the non-embossed regions, the paper thickness increases to a value greater than its nominal thickness, at least close to the borders to the embossed areas.

[0022] In the following, the invention is further explained by means of embodiments. The drawings show in

Fig. 1 a schematic representation of an embodiment of the cigarette paper according to the invention and an em- bossing cylinder used to apply embossings to the cigarette paper and

Fig. 2 a schematic representation of a filigrained cigarette paper of the prior art and an engraved cylinder used for preparing the prior art cigarette paper.

[0023] In Fig. 2, part of a cigarette paper 1 utilised as a rolling paper is displayed in a schematic longitudinal section (not in scale). Opposite to cigarette paper 1, part of the surface area of a main cylinder 2 is shown in schematic longitudinal section. The surface of main cylinder 2 is provided with raised structures 4 which form an image, design, logo or pattern to be applied to cigarette paper 1.

[0024] In a process called filigraining, the raw cigarette

paper 1 is passed between the main cylinder 2 and a smooth counter-cylinder supporting the back side 6 of cigarette paper 1. In this process, compressed zones 8 are formed in the cigarette paper 1 by the raised structures 4. Thus, the image, etc. to be applied to the cigarette paper 1 is present in the compressed zones 8, in which the cigarette paper 1 is thinner than its nominal thickness and is less opaque than in the areas keeping their nominal thickness. The total area of the compressed zones 8 is far less than the total area of the cigarette paper 1.

[0025] Fig. 1 is a similar view as Fig. 2 and illustrates a cigarette paper 10 according to the invention. Similar to Fig. 2, Fig. 1 is very schematic and not in scale.

[0026] The cigarette paper 10 has a front side 12 and, in the embodiment, a smooth back side 14. A large amount of the area of front side 12 is provided with embossments 16, in which the paper is thinner than its nominal thickness. The nominal thickness of cigarette paper 10 is the thickness of the regions between the embossments 16, i.e. essentially the thickness of the raw paper. The regions between the embossments 16 are designated by reference numeral 18. These regions form "image lines", i.e. any image, design, logo, pattern, etc. on the cigarette paper 10 formed as a relief raised over the surface of the embossments 16. The total area of the image lines 18 is at most 50% of the total area of cigarette paper 10, and usually it is much smaller than the total area of the embossments 16. Since in the area of the embossments 16 the cigarette paper 10 is less opaque than in the region of the image lines 18, the image lines 18 generally appear somewhat less transparent than the rest of cigarette paper 10 and are clearly visible. Moreover, as relief structures, the image lines 18 are touchable in principle.

[0027] The image lines 18 can be imparted to cigarette paper 10 by passing the cigarette paper 10 between a main cylinder 20 and, in the embodiment, a smooth counter-cylinder supporting the back side 14 of cigarette paper 10. The main cylinder 20 comprises depressions 22 corresponding to the image lines 18. The embossments 16 in cigarette paper 10 are formed by the main part 24 of the surface of the main cylinder 20.

[0028] In Figures 1 and 2, the edges are represented with sharp corners. In practice, however, the overall relief structure is less rectangular and has smoother edges.

[0029] In the following, some embodiments of cigarette paper 10 are described in more detail.

Example 1

[0030] A cigarette paper of rectangular shape, which can be used for rolling cigarettes, has a nominal thickness of 25 μm and comprises embossments (applied when the paper is generally dry), which cover about 92% of one of the faces of the cigarette paper. The non-embossed region defines a logo which essentially is composed of lines having a width between 0.2 mm and 1.0 mm. In the area of the embossments, the opacity of the cigarette paper is about 0.5; in the logo, the opacity is greater.

[0031] When a cigarette is rolled from this paper, the logo is placed on the outside. A user can feel it by means of the fingertips.

Example 2

[0032] A cigarette paper of rectangular shape for rolling cigarettes has a nominal thickness of 21 μm and comprises embossments (applied when the paper is generally dry) in the form of longitudinal stripes in parallel to its longitudinal edges. In the area of the embossments, the paper has a thickness of about 16 μm. The width of each stripe is about 1,0 mm, the region between two adjacent stripes having a width of about 0,5 mm.

[0033] When a cigarette is rolled with a sheet of this cigarette paper, due to the arrangement of the stripes, the paper bends much easier in a direction perpendicular to the stripes than in a direction along the stripes, which much facilitates the rolling procedure.

Example 3

[0034] A cigarette paper of rectangular shape for rolling cigarettes has a nominal thickness of 19 μm and comprises embossments (applied when the paper is generally dry) in the form of longitudinal stripes in parallel to its longitudinal edges. In the area of the embossments, the paper has a thickness of about 14 μm. The width of each stripe is about 0,8 mm, the region between two adjacent stripes having a width of about 0,7 mm. Additional stripes of 0,5 mm width and spaced to each other by 0,5 mm run perpendicular to the longitudinal stripes in an end zone of the cigarette paper having a width of 10 mm. Both kinds of stripes are arranged on the same side of the cigarette paper.

[0035] When rolling a cigarette from a sheet of this cigarette paper, the longitudinal stripes have the same effect as those in Example 2. The stripes are placed on the inner side of the cigarette paper. In this case, the transverse stripes in the end zone significantly increase the frictional forces between the tobacco and the inner side of the cigarette paper, thus reducing any tobacco loss form the end side of the cigarette. A filter can be placed at the opposite end side of the cigarette.

Example 4

[0036] A cigarette paper as in Example 3 additionally comprises two logos (e.g., a brand name and an abstract image) provided by embossments on its other side. The logos are defined by the regions between the embossed areas.

Example 5

[0037] A cigarette paper of rectangular shape, which

can be used for rolling cigarettes, has a nominal thickness of 30 μm and a nominal weight per unit area (grammage) of 20 g/m^2 and comprises embossments (applied when the paper is still very wet), which cover about 92% of one of the faces of the cigarette paper. The non-embossed region defines a logo which essentially is composed of lines having a width between 0.1 mm and 5.0 mm. In the area of the embossments, the grammage of the paper is reduced to 19 g/m^2 and the thickness to 25 μm. The opacity of the cigarette paper is reduced from the nominal value of 0.65 in the non-embossed regions to 0.60. Within the non-embossed regions, the paper essentially has maintained its original grammage, thickness and opacity.

[0038] When a cigarette is rolled from this paper, the logo is placed on the outside. A user can feel it by means of the fingertips.

Example 6

[0039] A cigarette paper of rectangular shape, which can be used for rolling cigarettes, has a nominal thickness of 30 μm and a nominal grammage of 20 g/m^2 and comprises embossments (applied when the paper is still very wet), which cover about 92% of one of the.faces of the cigarette paper. The non-embossed region defines a logo which essentially is composed of lines having a width between 0.1 mm and 5.0 mm. In the area of the embossments, the grammage of the paper is reduced to 19 g/m^2 and the thickness to 25 μm. The opacity of the cigarette paper is reduced from 0.65 (nominal value in the non-embossed regions) to 0.60. Within the non-embossed regions, the grammage of the paper has slightly increased to 22 g/m^2 due to displacement of paper fibres from the embossed areas to the non-embossed region, which leads to an increase in opacity to 0.7. The paper thickness also increased slightly from its nominal value of 30 μm to 32 μm.

[0040] When a cigarette is rolled from this paper, the logo is placed on the outside. A user can feel it by means of the fingertips.

Claims

1. Cigarette paper comprising embossments (16), the paper (10) having a nominal thickness and the paper (10) being thinner than its nominal thickness in the area of the embossments (16), **characterised in that** the area of the embossments (16) covers at least 50% of the total area of the cigarette paper (10).

2. Cigarette paper according to claim 1, **characterised in that** the cigarette paper (10) is a rolling paper.

3. Cigarette paper according to claim 1 or 2, **characterised in that,** in the area of the embossments (16), the opacity of the paper (10) is in the range from 0.2 to 0.9.

4. Cigarette paper according to anyone of claims 1 to 3, **characterised in that** the nominal thickness of the paper (10) is in the range from 15 μm to 30 μm.

5. Cigarette paper according to anyone of claims 1 to 4, **characterised in that** the nominal weight per unit area of the paper (10) is in the range from 11 g/m^2 to 27 g/m^2.

6. Cigarette paper according to anyone of claims 1 to 5, **characterised in that** the lower limit of the total area of the embossments (16), related to the total area of the cigarette paper (10), is selected from the following list: 55%, 60%, 65%, 70%, 75%, 80%, 85%, 90%, 95%.

7. Cigarette paper according to anyone of claims 1 to 6, **characterised in that,** between embossments (16), the cigarette paper (10) comprises regions (18) in which the paper (10) has its nominal thickness, these regions (18) having a width in the range from 0.1 mm to 5.0 mm.

8. Cigarette paper according to anyone of claims 1 to 7, **characterised in that** the embossments (16) form a regular pattern.

9. Cigarette paper according to anyone of claims 1 to 8, **characterised in that** the embossments (16) form a non-regular pattern or a motif.

10. Cigarette paper according to anyone of claims 1 to 9, **characterised in that** the paper (10) is embossed from one side (12).

11. Cigarette paper according to anyone of claims 1 to 9, **characterised in that** the paper is embossed from both sides.

12. Cigarette paper according to anyone of claims 1 to 11, **characterised in that** the embossments (16) are adapted to provide to the cigarette paper a reduced ignition propensity.

13. Cigarette paper according to anyone of claims 1 to 11, **characterized in that,** in the area of the embossments, the weight per unit area of the paper is smaller than its nominal weight per unit area, preferably smaller by 5% to 50%, related to the nominal weight per unit area.

14. Method of embossing cigarette paper, **characterised in that** cigarette paper comprising the features of anyone of claims 1 to 12 is prepared in an embossing apparatus, wherein the paper is embossed in a generally dry state.

15. Method according to claim 14, **characterised in that**

the cigarette paper is embossed by means of at least one embossing roller of an embossing unit placed in a gumming apparatus or an interleaving apparatus.

16. Method of embossing cigarette paper, **characterised in that** cigarette paper comprising the features of claim 13 is prepared by embossing the paper in a generally wet state, preferably during a paper making process.

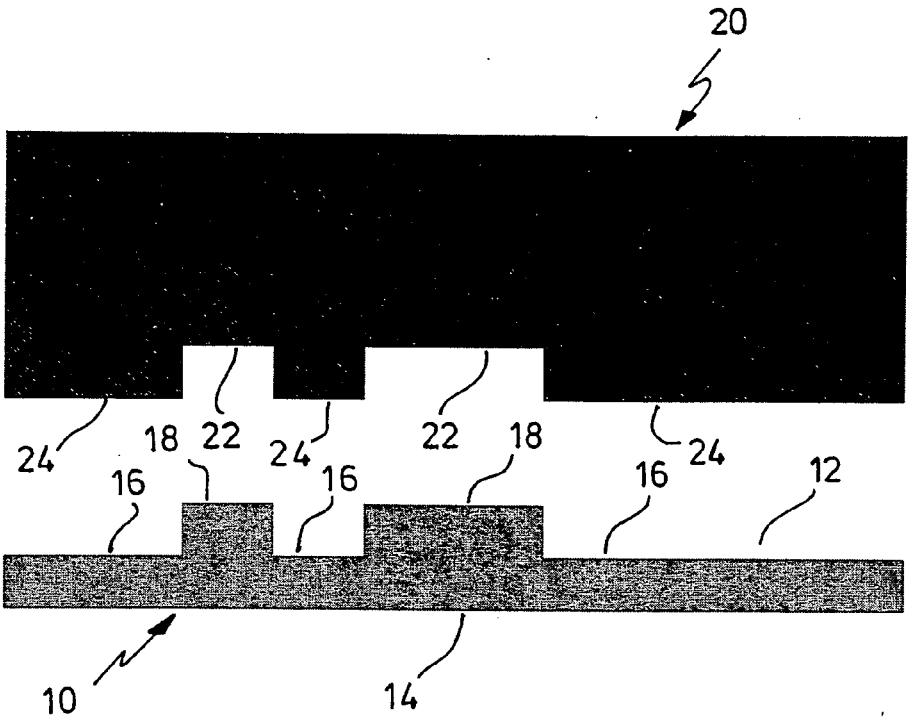

FIG.1

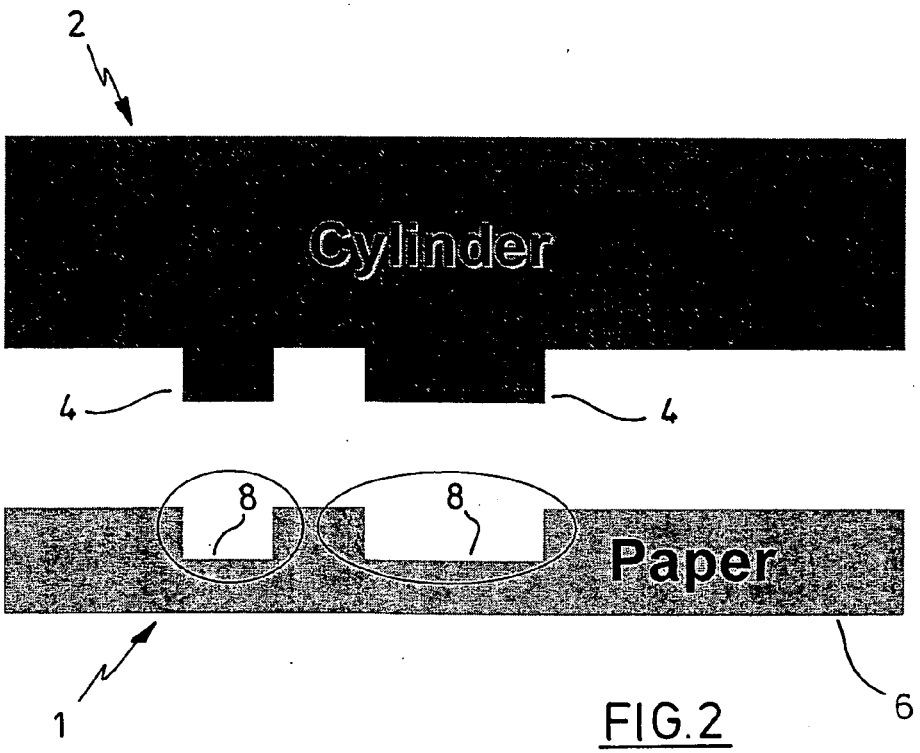

FIG.2

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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	10 December 2008	Maier, Michael

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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims

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