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(54) **FILTER FOR A SMOKING ARTICLE**

FILTER FÜR RAUCHARTIKEL

FILTRE POUR ARTICLE À FUMER

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Description

[0001] The present invention relates to filters for smoking articles.

[0002] It is well known that filtration of smoke in a smoking article, such as a cigarette may affect the taste and flavour characteristics of a product when smoked. Filters commonly include adsorbent materials, such as activated carbon, to reduce certain components of the smoke during smoking. However, activated carbon in a filter can adversely affect the taste and/or flavour characteristics of a cigarette.

[0003] Therefore, in a first aspect, there is provided a filter element for a smoking article, the filter element comprising a plug of filter material, and a tobacco thread, wherein the tobacco thread extends substantially longitudinally through the plug of filter material.

[0004] The inventors have found that the provision of the substantially longitudinal tobacco thread significantly improves the flavour of smoke (which comprises gas and particulate matter) that is inhaled by a smoker.

[0005] Preferably, the tobacco thread extends substantially longitudinally between mutually opposing end faces of the plug of filter material. Preferably, the tobacco thread extends in a direction which is substantially parallel to a side face of the plug of filter material, which side face is preferably substantially perpendicular to one or both end faces. Preferably, the tobacco thread extends through an inner portion of, and is surrounded by, the filter material. Preferably, the tobacco thread extends through substantially the centre of the plug of filter material.

[0006] Advantageously, the tobacco thread is disposed in close proximity with the path of the gaseous flow as it moves through the filter element, and is therefore able to affect various characteristics of the gaseous flow before the flow reaches the smoker's mouth. Furthermore, because the tobacco thread is disposed substantially longitudinally within the plug of filter material, it does not adversely affect the direction or rate of gaseous flow, and so the smoker does not detect a significant difference in the resistance to draw therethrough.

[0007] The tobacco thread may comprise shredded tobacco, powdered tobacco, reconstituted tobacco and/or cut tobacco. However, preferably the tobacco thread comprises tobacco fibres and/or tobacco sheet. The tobacco thread may be prepared using technology known in the art. By way of example only, a slurry comprising tobacco particles (e.g. tobacco dust and/or tobacco stems), and preferably a suitable binding agent, may be prepared. The slurry may be spread on to a support surface, such as a conveyer, to thereby form a wet tobacco sheet. The wet sheet may then be heated, for example, by an oven, such that the slurry dries, thereby forming a tobacco sheet. The tobacco sheet may then be cut to form the thread having appropriate dimensions.

[0008] The tobacco thread may be between about 0.2mm and 5mm in diameter, and is preferably between about 0.4mm and 3mm in diameter.

[0009] Once prepared, the tobacco thread may then be encased by filter material to form the filter element of the first aspect. The plug of filter material may comprise any suitable filter media, which will be known to the skilled technician. A preferred filter material comprises cellulose acetate. The diameter of the plug of filter material may be between about 5mm and 15mm, preferably between 6mm and 12mm, more preferably between 7mm and 11mm, and most preferably between 8mm and 10mm. The diameter of the plug may be between 5 and 10mm.

[0010] Preferably, the ratio of the diameter of the plug of filter material to the diameter of the tobacco thread is between 2:1 and 25:1, and is more preferably between 4:1 and 10:1.

[0011] The filter element may comprise a flavourant. In embodiments where a flavourant is used, the flavourant may be incorporated in the plug of filter material. However, preferably the flavourant is incorporated in the tobacco thread. Once formed, the thread may be dipped into a vessel containing the flavourant. However, preferably the flavourant is included in the slurry from which the thread is prepared.

[0012] It will be appreciated that the filter element according to the first aspect may be used in the manufacture of a filter, for use in a smoking article.

[0013] Hence, according to a second aspect of the invention, there is provided a filter for a smoking article, the filter comprising a filter element according to the first aspect.

[0014] The filter of the second aspect may comprise a plurality of filter elements according to the first aspect, in which a tobacco thread extends through a plug of filter material. For example, the filter may comprise 2, 3, 4, 5 or more filter elements of the first aspect, in which adjacent filter elements may either be connected to each other, or which elements may be separated from each other by other filter elements (which may not be in accordance with the first aspect).

[0015] Hence, the filter may comprise a plurality of filter elements, at least one of which is a filter element according to the first aspect of the invention. For example, it is envisaged that, in one embodiment, in addition to comprising one or more filter elements according to the first aspect (ie. containing the tobacco thread), the filter of the second aspect may also comprise an adsorbent filter element, which element comprises an adsorbent material. The adsorbent filter element is provided to adsorb and, hence, reduce certain components of the smoke during smoking. The adsorbent filter element may comprise a plug of filter material in which the adsorbent material is dispersed. The filter material may be cellulose acetate. A preferred adsorbent material is activated carbon. The activated carbon may be in the form of granular activated carbon, which is preferably distributed substantially throughout the volume of the plug of filter material. Preferably, the adsorbent filter element does not include a tobacco thread.

[0016] In another embodiment, in addition to comprising one or more filter elements according to the first aspect (ie. containing the tobacco thread), the filter of the second aspect may also comprise a filter element, which comprises filter material (such as, cellulose acetate), and which does not include a tobacco thread or adsorbent material.

[0017] The filter may comprise at least two, and preferably at least three filter elements, provided that at least one filter element is in accordance with the first aspect. Preferably, the filter comprises a filter element according to the first aspect, an adsorbent filter element comprising adsorbent, and a filter element, which does not include adsorbent or a tobacco thread. Preferably, multiple filter elements are arranged longitudinally of one another with the end face of one filter element abutting the end face of an adjacent filter element. It is preferred that the filter elements have substantially similar diameters. It should be appreciated that the various filter elements may be in any order in the filter, as illustrated in Figures 3 and 4.

[0018] The filter element of the first aspect, or the filter of the second aspect, may be incorporated into a smoking article.

[0019] Hence, according to a third aspect of the invention, there is provided a smoking article comprising a filter element according to the first aspect, or a filter according to the second aspect.

[0020] The smoking article preferably comprises a section of smokeable material, such as tobacco. As used herein, the term "smoking article" includes smokeable products such as cigarettes, cigars and cigarillos whether based on tobacco, tobacco derivatives, expanded tobacco, reconstituted tobacco or tobacco substitutes and also heat-not-burn products.

[0021] The section of smokeable material and the filter may be attached by tipping paper.

[0022] According to a fourth aspect of the invention, there is provided a method of manufacturing a filter element for a smoking article, the method comprising providing a tobacco thread through a plug of filter material, wherein the tobacco thread extends substantially longitudinally through the plug of filter material.

[0023] The method preferably comprises a step of introducing the tobacco thread into substantially the centre of the filter material. The method may comprise using guide means to guide the tobacco thread as a tow of filter material is formed therearound. The guide means may comprise a guide tube through which the thread is entrained. As the thread exits the guide means, it is preferably surrounded by filter material.

[0024] All of the features described herein (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined with any of the above aspects in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

[0025] For a better understanding of the invention, and to show how embodiments of the same may be carried into effect, reference will now be made, by way of example, to the accompanying Figures, in which:-

Figure 1 shows a perspective view of a smoking article, including a rod of smokeable material, a filter in accordance with the invention, and tipping paper attaching the rod and filter together;

Figure 2 shows a cross-sectional side view of a first embodiment of the filter according to the invention;

Figure 3 shows a cross-sectional side view of a second embodiment of the filter; and

Figure 4 shows a cross-sectional side view of a third embodiment of the filter.

[0026] Referring to Figure 1, there is shown a smoking article 2, in the form of a cigarette, which includes a filter 4 in accordance with the invention. Even though the Figures show the smoking article 2 as a cigarette, it should be appreciated that the smoking article 2 may take other forms, such as cigars and cigarillos etc, which may also include the filter 4 according to the invention. Referring to Figure 1, the smoking article 2 comprises a generally cylindrical paper-wrapped rod 6 of smokeable material, such as tobacco, which is co-axially attached to the filter 4 by tipping paper 8, which is glued around one end of the rod 6 and the filter 4.

[0027] Referring to Figure 2, there is shown a first embodiment of the filter 4 attached to the rod of tobacco 6. In this embodiment, the filter 4 is made up of a single, filter element 12 about 27mm in length, which consists of a continuous plug of filter material 20 (for example, cellulose acetate) having a diameter of 9mm. The filter element 12 has first and second generally circular end faces 22, 24, and a circumferential or longitudinally extending side surface 26 substantially perpendicular to the first and second end faces 22, 24. As shown in Figure 2, a thin tobacco thread 10 having a diameter of 0.8mm extends between the two end faces 22, 24 through the plug of filter material 20. The thread is substantially parallel with the longitudinally extending surface 26, and extends substantially through the centre of the plug of filter material 20, thereby forming a core.

[0028] The thread of tobacco 10 is prepared either from tobacco fibres and/or tobacco sheet, using technology known in the art, and using materials which may be obtained from LTR industries, France, or from Deli-HTL, Holland. For example, a wet slurry of tobacco dust, cut tobacco stems, and a binding agent is initially prepared, and then rolled out on to a stainless steel conveyer to form a wet tobacco sheet. The conveyer is fed into an oven which heats the slurry until it dries, thereby forming a band cast reconstituted tobacco sheet. For example, suitable heating may be at about 70-100°C for about 6-8 minutes. The tobacco sheet is then cut to the appropriate

dimensions (0.8mm diameter) by cutters to produce thread 10, which may then be fed on to a reel, ready for use. Flavourant may be added to the sheet, before being formed into the thread 10. Another example for preparing the tobacco thread 10 is by tightly twisting tobacco plant fibres in a similar method to that used for preparing cotton.

[0029] The resultant thread 10 is approximately 0.8mm in diameter, which is then introduced into the centre of the filter material 20. One method of introducing the tobacco thread 10 in to the plug of filter material 20 in the manufacture of the filter element 12 as follows. The method involves entraining the tobacco thread 10 through the lumen of a guide tube having a diameter of about 1.5mm. Simultaneously, a supply of fibrous filter material 20 (e.g. cellulose acetate) is passed through a series of blooming rollers so that it is de-crimped. A tow of de-crimped filter material 20 is then formed around the thread 10 as it exits the guide tube, to thereby form a continuous rod of filter material 20 enclosing the thread 10. The rod may then be cut up in to sections to produce the completed filter element 12 as shown in Figure 2. The length of the filter element 12 will depend on the type of filter 4 required. For example, a standard cigarette filter 4 is about 27mm in length. In the embodiment shown in Figure 2, the whole 27mm length of the filter 4 consists of the filter element 12, such that the thread 10 extends all the way along. However, Figures 3 and 4 illustrate other embodiments, in which the filter 4 comprises a shorter section of the filter element 12 containing the thread 10 in combination with other sections, as described below.

[0030] Referring to Figure 3, there is a shown a second embodiment of the filter 4 attached to the rod of tobacco 6. The filter 4 comprises a plurality of different discrete filter elements 12, 14, 16, each of which may have a different material composition. In this embodiment, the filter 4 includes three different filter elements 12, 14, 16. Each filter element 12, 14, 16 is generally cylindrical in shape having substantially equivalent diameters. Each filter element 12, 12, 16 is wrapped by a layer of thin sheet material in the form of a wrapper known as plugwrap (not shown), which may be formed of conventional paper materials. The filter element 16 that is farthest from the tobacco rod 6 (and which will be closest to the smoker's mouth when in use) comprises a generally cylindrical tow of filter material 20, such as cellulose acetate. The filter material 20 provides a filter through which smoke may pass as a smoker inhales on the cigarette. The filter element 12 that is disposed adjacent element 16 contains a continuous plug of filter material 20 having the tobacco thread 10 extending substantially longitudinally therethrough. This filter element 12 is similar to that shown in Figure 1, except that it does not extend along the entire length of the filter 4.

[0031] The third filter element 14 that is disposed between the filter element 12 containing the tobacco thread 10 and the tobacco rod 6 comprises a plug of filter material 20, in which an adsorbent, such as activated carbon 18, has been dispersed. The activated carbon 18 may be in the form of granular activated carbon 18, which is distributed evenly throughout the volume of the plug of cellulose acetate 20 in a "Dalmatian" style, as is known in the art, and as shown in Figure 3. Alternatively, the activated carbon 18 may be sprinkled onto a sticky exterior surface 26 of the plug of cellulose acetate 20, or adhered to the inner surface of plugwrap surrounding the cellulose acetate, or adhered to a cotton thread surrounded by the plug of cellulose acetate 20 (not shown). The activated carbon 18 could also be held in a cavity surrounded by the plug of cellulose acetate 20. The activated carbon 18 is provided to improve the characteristics of the smoke that is inhaled by removing toxic chemicals.

[0032] Referring to Figure 4, there is a shown a third embodiment of the filter 4 attached to the tobacco rod 6. In this embodiment, the filter 4 includes the same three filter elements 12, 14, 16 as in the second embodiment, as described above, except that the order of the elements has been changed. As shown in Figure 4, the filter element 16 that is farthest from the tobacco rod 6 comprises filter material 20, such as cellulose acetate, as in the second embodiment. However, in the third embodiment, the filter element 12 that is disposed adjacent element 16 contains a plug of filter material 20, in which particles of activated carbon 18 have been dispersed. Finally, the third filter element 12 disposed between element 14 and the rod of tobacco 6 contains a continuous plug of filter material 20 through which the tobacco thread 10 extends. Accordingly, the positions of filter elements 12, 14 have been swapped in the second and third embodiments.

[0033] As shown in Figures 3 and 4, the filter elements 12, 14, 16 are arranged longitudinally of one another with the end face 22, 24 of each filter element 12, 14, 16 abutting the next. Although the three filter elements 12, 14, 16 are shown in Figures 3 and 4 as being substantially equal in length, it will be appreciated that they could have different lengths. For example, in Figures 3 and 4, the filter element 12 containing the tobacco thread 10 could be 12mm in length, and the other elements 14, 16 could be 7.5mm each, such that the total length of the filter 4 is 27mm. In addition, it will be appreciated that the filter 4 may comprise only the two filter elements. For example, the filter 4 may comprise the filter element 12 containing the tobacco thread 10 (about 15mm long) and the filter element 16 containing only filter material 20 (about 12mm long), in either order. Alternatively, the filter 4 may comprise the filter element 12 containing the tobacco thread 10 and the filter element 14 containing activated carbon 18, in either order.

[0034] Also, the filter 4 may comprise more than three filter elements 12, 14, 16. For example, the filter 4 may comprise first and second filter elements 16 composed of cellulose acetate, a third filter element 14 comprising cellulose acetate and activated carbon 18, and a fourth filter element 12 comprising the longitudinal tobacco thread 10 core, as described above. It will be appreciated that the various filter elements 12, 14, 16 may be ar-

ranged in the filter 4 in a variety of alternative orders. However, in each embodiment, at least one filter element 12 containing the tobacco thread 10 is included in the filter 4.

[0035] Referring to Figure 1 once again, the filter 4 is located at a mouth-end of the smoking article 2 such that a gaseous flow, comprising smoke drawn from the rod 6 of smokeable material, moves through the filter 4 before entering the mouth of a smoker. The tobacco thread 10 is located in one or more filter elements 12, and extends longitudinally between the end faces 22, 24 of a plug of filter material 20, as described in relation to Figure 2. In this way, the tobacco thread 10 is disposed in close proximity with the path of the gaseous flow as it moves through the filter 4, and is therefore able to affect various characteristics of the gaseous flow before the flow reaches the smoker's mouth.

[0036] The tobacco thread 10 may, for example, affect the overall properties of the gaseous flow such that the taste and flavour of the gaseous flow are improved. One application of the tobacco thread 10 is to replace a degree of the taste and flavour characteristics of the gaseous flow which may be lost as the gaseous flow moves through the filter material 20, or the activated carbon 18, which is known to affect the taste and flavour of tobacco smoke. The inventors have surprisingly found that the arrangement of the thin thread of tobacco 10 extending longitudinally through the plug of filter material 20 improves the flavour of the smoke without compromising the flow characteristics of the smoke.

[0037] The invention also includes further modifications and variations falling within the scope of the claims.

Claims

1. A filter element for a smoking article, the filter element comprising a plug of filter material, and a tobacco thread, wherein the tobacco thread extends substantially longitudinally through the plug of filter material.

2. A filter element according to claim 1, wherein the tobacco thread extends substantially longitudinally between mutually opposing end faces of the plug of filter material.

3. A filter element according to claim 2, wherein the tobacco thread extends in a direction which is substantially parallel to a side face of the plug of filter material, which side face is substantially perpendicular to one or both end faces.

4. A filter element according to any preceding claim, wherein the tobacco thread extends through an inner portion of, and is surrounded by, the filter material.

5. A filter element according to any preceding claim, wherein the tobacco thread extends through substantially the centre of the plug of filter material.

6. A filter element according to any preceding claim, wherein the tobacco thread is between 0.2mm and 5mm in diameter, and preferably between 0.4mm and 3mm in diameter.

7. A filter for a smoking article, the filter comprising a filter element according to any one of claims 1 to 6.

8. A filter according to claim 7, wherein the filter comprises a plurality of filter elements, at least one of which is a filter element according to any one of claims 1 to 6.

9. A filter according to either claim 7 or claim 8, wherein the filter comprises an adsorbent filter element, which element comprises an adsorbent material, optionally activated carbon.

10. A smoking article comprising a filter element according to any one of claims 1 to 6, or a filter according to any one of claims 7 to 8.

11. A method of manufacturing a filter element for a smoking article, the method comprising providing a tobacco thread through a plug of filter material, wherein the tobacco thread extends substantially longitudinally through the plug of filter material.

12. A method according to claim 11, wherein the method comprises a step of introducing the tobacco thread into substantially the centre of the filter material.

13. A method according to either claim 11 or claim 12, wherein the method comprises using guide means to guide the tobacco thread as a tow of filter material is formed therearound.

14. A method according to claim 13, wherein the guide means comprises a guide tube through which the thread is entrained.

Patentansprüche

1. Filterelement für einen Rauchartikel, wobei das Filterelement einen Stopfen aus Filtermaterial und einen Tabakfaden aufweist, wobei sich der Tabakfaden im Wesentlichen in Längsrichtung durch den Stopfen des Filtermaterials erstreckt.

2. Filterelement nach Anspruch 1, wobei sich der Tabakfaden im Wesentlichen in Längsrichtung zwischen einander gegenüberliegenden Stirnflächen des Stopfens des Filtermaterials erstreckt.

3. Filterelement nach Anspruch 2, wobei sich der Tabakfaden in einer Richtung erstreckt, die im Wesentlichen parallel zu einer Seitenfläche des Stopfens des Filtermaterials angeordnet ist, wobei die Seitenfläche im Wesentlichen senkrecht zu einer oder beiden Stirnflächen angeordnet ist.

4. Filterelement nach einem der vorhergehenden Ansprüche, wobei sich der Tabakfaden durch einen inneren Abschnitt des Filtermaterials erstreckt und von diesem umgeben ist.

5. Filterelement nach einem der vorhergehenden Ansprüche, wobei sich der Tabakfaden im Wesentlichen durch das Zentrum des Stopfens des Filtermaterials erstreckt.

6. Filterelement nach einem der vorhergehenden Ansprüche, wobei der Tabakfaden einen Durchmesser zwischen 0,2 mm und 5 mm und vorzugsweise zwischen 0,4 mm und 3 mm aufweist.

7. Filter für einen Rauchartikel, wobei das Filter ein Filterelement nach einem der Ansprüche 1 bis 6 umfasst.

8. Filter nach Anspruch 7, wobei das Filter mehrere Filterelemente umfasst, von denen mindestens eines ein Filterelement nach einem der Ansprüche 1 bis 6 ist.

9. Filter nach Anspruch 7 oder Anspruch 8, wobei das Filter ein Adsorptionsfilterelement umfasst, wobei das Element ein Adsorptionsmaterial, optional Aktivkohle, umfasst.

10. Rauchartikel, der ein Filterelement nach einem der Ansprüche 1 bis 6 oder ein Filter nach einem der Ansprüche 7 bis 8 umfasst.

11. Verfahren zur Herstellung eines Filterelements für einen Rauchartikel, wobei das Verfahren das Bereitstellen eines Tabakfadens durch einen Stopfen aus Filtermaterial umfasst, wobei sich der Tabakfaden im Wesentlichen in Längsrichtung durch den Stopfen des Filtermaterials erstreckt.

12. Verfahren nach Anspruch 11, wobei das Verfahren einen Schritt des Einführens des Tabakfadens in im Wesentlichen das Zentrum des Filtermaterials umfasst.

13. Verfahren nach Anspruch 11 oder Anspruch 12, wobei das Verfahren das Verwenden von Führungsmitteln umfasst, um den Tabakfaden zu führen, wenn ein Tau des Filtermaterials um diese herum gebildet wird.

14. Verfahren nach Anspruch 13, wobei das Führungsmittel ein Führungsrohr umfasst, durch das der Faden mitgerissen wird.

Revendications

1. Élément filtrant pour un article à fumer, l'élément filtrant comprenant un embout de matériau filtrant, et un fil de tabac, le fil de tabac s'étendant suivant un plan sensiblement longitudinal à travers l'embout de matériau filtrant.

2. Élément filtrant selon la revendication 1, le fil de tabac s'étendant suivant un plan sensiblement longitudinal entre des faces d'extrémité mutuellement opposées de l'embout de matériau filtrant.

3. Élément filtrant selon la revendication 2, le fil de tabac s'étendant suivant un sens qui est sensiblement parallèle à une face latérale de l'embout de matériau filtrant, cette face latérale étant sensiblement perpendiculaire à l'une des faces d'extrémité, et à ces deux faces.

4. Élément filtrant selon une quelconque revendication précédente, le fil de tabac s'étendant à travers une portion interne du matériau filtrant, ou étant entouré par ce dernier.

5. Élément filtrant selon une quelconque revendication précédente, le fil de tabac s'étendant à travers le centre sensiblement de l'embout de matériau filtrant.

6. Élément filtrant selon une quelconque revendication précédente, le fil de tabac ayant un diamètre entre 0,2 mm et 5 mm, et de préférence un diamètre entre 0,4 mm et 3 mm.

7. Filtre pour un article à fumer, le filtre comprenant un élément filtrant selon l'une quelconque des revendications 1 à 6.

8. Filtre selon la revendication 7, le filtre comprenant une pluralité d'éléments filtrants, dont l'un au moins est un élément filtrant selon l'une quelconque des revendications 1 à 6.

9. Filtre selon soit la revendication 7 soit la revendication 8, le filtre comprenant un élément filtrant adsorbant, cet élément comportant un matériau adsorbant, facultativement du charbon actif.

10. Article à fumer comprenant un élément filtrant selon l'une quelconque des revendications 1 à 6, ou un filtre selon l'une quelconque des revendications 7 à 8.

11. Procédé de fabrication d'un élément filtrant pour un article à fumer, le procédé comprenant l'opération consistant à prévoir un fil de tabac à travers un embout de matériau filtrant, le fil de tabac s'étendant suivant un plan sensiblement longitudinal à travers l'embout de matériau filtrant.

12. Procédé selon la revendication 11, le procédé comprenant une étape d'introduction du fil de tabac dans le centre sensiblement du matériau filtrant.

13. Procédé selon soit la revendication 11 soit la revendication 12, le procédé comprenant l'utilisation d'un moyen de guidage pour guider le fil de tabac au fur et à mesure qu'une filasse de matériau filtrant est formée autour de celui-ci.

14. Procédé selon la revendication 13, le moyen de guidage comprenant un tube de guidage à travers lequel le fil est entraîné.

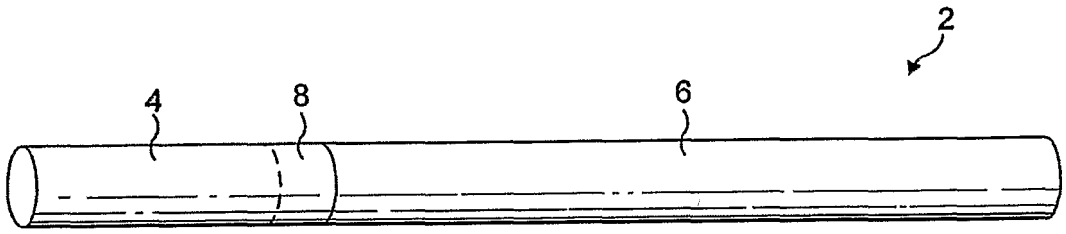


FIG. 1

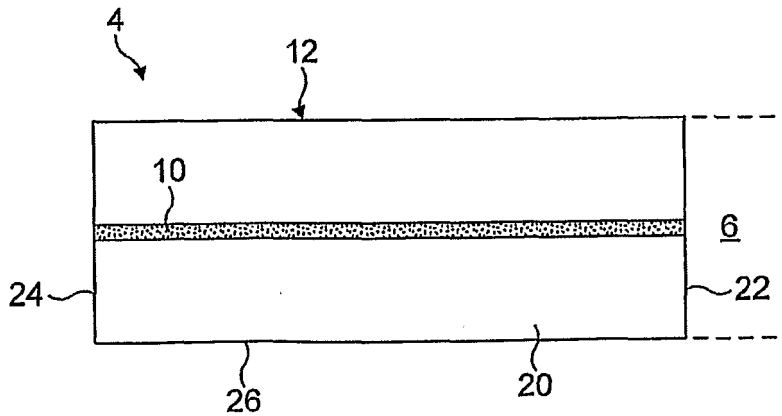


FIG. 2

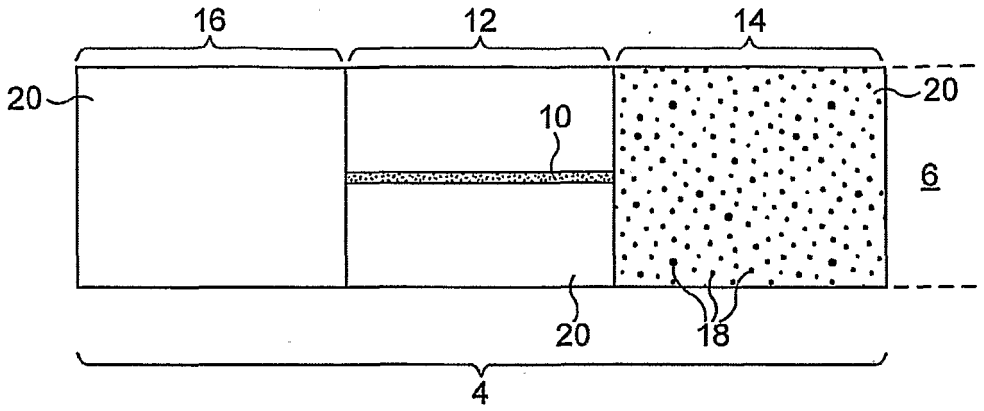


FIG. 3

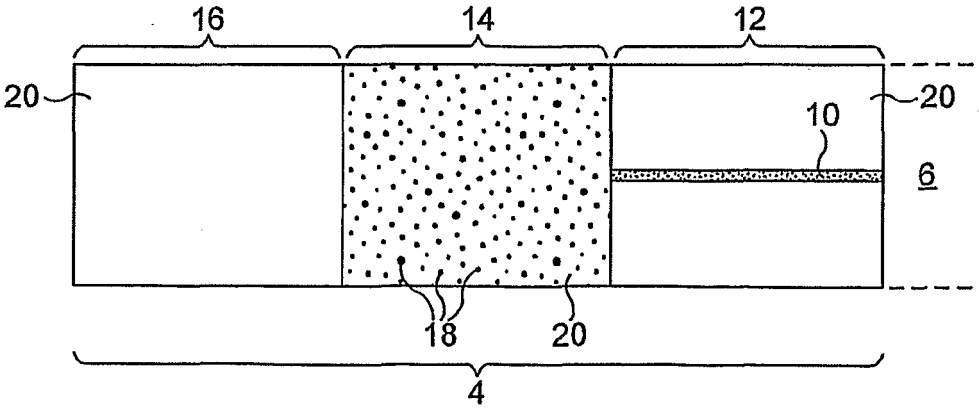


FIG. 4