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(54) **PARTICLE TYPE CIGARETTE HAVING MAGNETICALLY-SEALED DOWNSTREAM PORTION OF PARTICLE SECTION AND MANUFACTURING METHOD THEREFOR**

PARTIKELARTIGE ZIGARETTE MIT MAGNETISCH ABGEDICHTETEM STROMABWÄRTSBEREICH EINES PARTIKELABSCHNITTS UND HERSTELLUNGSVERFAHREN DAFÜR

CIGARETTE DE TYPE À PARTICULES AYANT UNE PARTIE AVAL SCELLÉE MAGNÉTIQUEMENT DE SECTION DE PARTICULES ET PROCÉDÉ DE FABRICATION ASSOCIÉ

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- **No further relevant documents disclosed**

## Description

### TECHNICAL FIELD

**[0001]** The present invention belongs to the field of tobacco, and in particular, to the technical field of particle-type cigarettes using tobacco particles as smoking materials.

### BACKGROUND

**[0002]** Particle-type cigarette is a new type of heat-not-burn (abbreviated as HNB) cigarette in recent years, using tobacco particles instead of tobacco sheets as the smoking material, as tobacco particles are more uniformly heated than tobacco sheets, and smoke spreads more smoothly along the gap between the particles than the HNB tobacco sheet cigarette, it is popular among consumers.

**[0003]** An example of HNB cigarette of the prior art is disclosed in document CN113412971A.

**[0004]** Particle-type cigarettes are usually formed by filling tobacco particles into a paper tube sealed at the distal lip end to form a particle section and set a porous firmware section (or a gear), a cooling section (which can be a perforated cavity section, or a cavity section filled with cooling materials) and a filter section downstream of the particle section. As tobacco particles are loose and fluid, if not constrained, they may flow to the downstream cavity section when the cigarette is placed horizontally, such tobacco particles flowing to the downstream may not be effectively heated by the heater, thus affecting the smoking effect; therefore, in all the current particle-type cigarette structures, components are designed to constrain the flow of tobacco particles, the upstream of particles is usually constrained by the sealing film, and the downstream is constrained by the porous firmware section (or gear).

**[0005]** The porous firmware section is usually made of ceramic or silicone, and its outer wall is firmly adhered to the inner wall of the paper tube through the adhesive, its center and/or the periphery are disposed with axial holes or ventilation slots that can be used for smoke passing through while not allowing tobacco particles to pass through, which can block tobacco particles while transmitting smoke. Besides, when the resistance heating plate or electromagnetic heating plate is inserted into the particle section for central heating, the porous firmware section is firmly adhered to the inner wall of the paper tube to prevent tobacco particles from pushing the porous firmware section to the downstream under the insertion force of the heating plate. However, the existence of the porous firmware section has brought inconveniences to industrialization of particle-type cigarettes. Therefore, persons skilled in the art have always been wishing to eliminate the porous firmware section.

**[0006]** The present invention aims to solve the above-mentioned problems.

### SUMMARY

**[0007]** A first aspect of the present invention discloses a particle-type cigarette wherein downstream of a particle section is magnetically sealed. The cigarette includes a paper tube 5, a sealing film 1 that seals the distal lip end of the paper tube 5, the particle filling section is located in the downstream of the sealing film 1, and the particle filling section is filled with uniformly mixed tobacco particles 2 and susceptor particles 3, the particle filling section is located immediately downstream of the magnet chip bridging layer 9, which is circumferentially magnetically fixed to the wall-attached iron foil ring 4 on the inner surface of or inside the side wall of the paper tube 5 , the downstream of the magnet chip bridging layer 9 is successively the cavity section 7 and the filter section 8.

**[0008]** The upstream and downstream are determined by the direction of smoke flow.

**[0009]** The susceptor particle 3 is used to induce heat under the action of an external alternating electromagnetic field and in situ heat the tobacco particle 2 to make it smoke.

**[0010]** Preferably, the side wall of the cavity section 7 has ventilation holes 6. During user smoking, the external air can enter the cavity section through the ventilation holes to mix with the smoke and cool the smoke.

**[0011]** Wherein, the magnet chip bridging layer 9 is a permeable bridging layer formed by stacking and bridging of bar magnet chips. The layer formed with the bridging is usually naturally permeable, which does not need to be deliberately controlled.

**[0012]** Preferably, the wall-attached iron foil ring 4 is prefabricated on the inner surface of or inside the side wall of the paper tube 5, and the wall-attached iron foil ring 4 is a continuous or discontinuous ring, preferably a discontinuous ring. The wall-attached iron foil ring 4 extends, e.g., 3-6 mm, upwards in the cigarette in the axial direction to control the thickness of the magnet chip bridging layer 9.

**[0013]** Preferably, the paper tube 5 is an integral paper tube, and the wall-attached iron foil ring 4 is adhered to the surface of or inside the paper material before the paper material is rolled into paper tube and is rolled with the paper material to be preset on the paper tube, whereby the wall-attached iron foil ring 4 is firmly fixed with the paper tube 5, thereby providing magnetic fixation for the magnet chip bridging layer 9.

**[0014]** A second aspect of the present invention discloses a manufacturing method of the particle-type cigarette wherein downstream of a particle section is magnetically sealed, the method includes the following steps: the paper tube 5 with a wall-attached iron foil ring 4 prefabricated on the side wall is provided, the distal lip end is sealed with the sealing film 1, the paper tube 5 is erected and filled with uniformly mixed tobacco particles 2 and susceptor particles 3 until the particle level reaches the vicinity of the wall-attached iron foil ring 4, e.g., it can be ±2-3mm away from the upstream edge of the wall-at-

tached iron foil ring 4, the bar magnet chip precursors are filled into the paper tube 5 and stacked with each other to bridging, the bar magnet chip precursors are magnetized by an external magnetic field to convert into bar magnet chips, which are attracted with each other and attract the wall-attached iron foil ring 4 with magnetic force to form the magnet chip bridging layer 9, the cavity section 7 is reserved and the filter section 8 is filled downstream of the cavity section 7.

**[0015]** The magnet chip precursors, such as iron chips, steel chips or ferrite chips, are not originally magnetic, however, they can obtain magnetism under the action of an external magnetic field, especially a strong directional magnetic field, and maintain magnetism for a long time, which can be up to several months to several years. Such magnet chip precursors are known materials in the field of magnetic materials.

**[0016]** Preferably, ventilation holes 6 are also preset on the side wall of the paper tube 5 corresponding to the cavity section 7.

**[0017]** The above technical solutions can be freely combined under the premise of no contradiction.

**[0018]** The present invention has the following beneficial effects:

1. The magnet chip bridging layer can also play the role of restraining tobacco particles and passing through the smoke.

2. The present invention is especially suitable for use in combination with HNB particle-type cigarette of magnetic particle with homogeneous heat, as susceptor particles are mixed with tobacco particles and heated in situ under the action of an external alternating magnetic field, and there is no need to additionally insert a resistance heating plate or an electromagnetic heating plate into the smoking particle section; thus, there is no insertion force that may drive the particles towards the downstream of cigarettes. Therefore, the magnetic force of the magnet chips can be used to attract and bridge, which is sufficient to provide constraints on the particles, without using a solid porous firmware section.

3. The present invention subtly replaces the porous firmware section with a magnet chip bridging layer, thus eliminating inconvenience of producing porous firmware section in the industrialization of cigarettes.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0019]** FIG.1 is a schematic structural view of a magnetically sealed particle-type cigarette downstream of the particle section of the present invention.

List of signs in the drawings:

**[0020]**

1. Sealing film
2. Tobacco particles
3. Susceptor particles
4. Wall-attached iron foil ring
5. Paper tube
6. Ventilation hole
7. Cavity section
8. Filter section
9. Magnet chip bridging layer.

## DETAILED DESCRIPTION OF THE EMBODIMENTS

**[0021]** The content of the present invention is further described below through specific embodiments.

Embodiment 1

**[0022]** As is shown in FIG.1, the particle-type cigarette wherein downstream of a particle section is magnetically sealed of the present invention include a paper tube 5, a sealing film 1 that blocks the distal lip end of the paper tube 5, a particle filling section located immediately downstream of the sealing film 1, the particle filling section accommodates uniformly mixed tobacco particles 2 and susceptor particles 3, a magnet chip bridging layer 9 is located immediately downstream of the particle filling section, the magnet chip bridging layer 9 is circumferentially magnetically fixed to the wall-attached iron foil ring 4 on the inner surface of or inside the side wall of the paper tube 5, the downstream of the magnet chip bridging layer 9 is successively the cavity section 7 and the filter section 8.

Embodiment 2

**[0023]** The embodiment relates to a manufacturing method of the particle-type cigarette wherein downstream of a particle section is magnetically sealed, the method includes the following steps: the paper tube 5 with a wall-attached iron foil ring 4 prefabricated on the side wall is provided, the distal lip end is sealed with the sealing film 1, the paper tube 5 is erected and filled with uniformly mixed tobacco particles 2 and susceptor particles 3 until the particle level reaches the vicinity of the wall-attached iron foil ring 4, e.g., it can be ±3-5mm away from the upstream edge of the wall-attached iron foil ring 4, the bar magnet chip precursors are filled into the paper tube 5 and stacked with each other to bridge, the bar magnet chip precursors are magnetized by an external magnetic field to convert them into bar magnet chips,

which are attracted with each other and attract the wall-attached iron foil ring 4 with magnetic force to form the magnet chip bridging layer 9, the cavity section 7 is reserved and the filter section 8 is filled downstream of the cavity section 7.

**[0024]** The above are only specific embodiments of the present invention, the protection scope of the present invention is not limited thereto. Persons skilled in the art can easily think of changes or substitutions within the technical scope disclosed by the present invention should be included within the protection scope of the present invention. Therefore, the protection scope of the present invention should be subject to the protection scope of the claims.

## Claims

1. A particle-type cigarette wherein downstream of a particle section is magnetically sealed, the cigarette comprises a paper tube (5), a sealing film (1) that blocks the distal lip end of the paper tube (5), a particle filling section located immediately downstream of the sealing film (1), the particle filling section is filled with uniformly mixed tobacco particles (2) and susceptor particles (3), **characterized in that**, a magnet chip bridging layer (9) is located immediately downstream of the particle filling section, the magnet chip bridging layer (9) is circumferentially magnetically fixed to a wall-attached iron foil ring (4) on the inner surface of or inside the side wall of the paper tube (5) , the downstream of the magnet chip bridging layer (9) is successively a cavity section (7) and a filter section (8).

2. The particle-type cigarette wherein downstream of a particle section is magnetically sealed according to claim 1, wherein, the side wall of the cavity section (7) has ventilation holes (6).

3. The particle-type cigarette wherein downstream of a particle section is magnetically sealed according to claim 1, wherein, the magnet chip bridging layer (9) is a permeable bridging layer formed by stacking and bridging of bar magnet chips.

4. The particle-type cigarette wherein downstream of a particle section is magnetically sealed according to claim 1, wherein, the wall-attached iron foil ring (4) is prefabricated on the inner surface of or inside the side wall of the paper tube (5), and the wall-attached iron foil ring (4) is a continuous or discontinuous ring.

5. The particle-type cigarette wherein downstream of a particle section is magnetically sealed according to claim 4, wherein, the paper tube (5) is an integral paper tube, and the wall-attached iron foil ring (4) is adhered to the surface of or inside the paper material before the paper material is rolled into paper tube and is rolled with the paper material into paper tube to be preset on the paper tube.

6. A manufacturing method of the particle-type cigarette wherein downstream of a particle section is magnetically sealed according to claim 1, **characterized in that**, the method comprises the following steps: the paper tube (5) with a wall-attached iron foil ring (4) prefabricated on the side wall is provided, the distal lip end is sealed with the sealing film (1), the paper tube (5) is erected and filled with uniformly mixed tobacco particles (2) and susceptor particles (3) until the particle level reaches the vicinity of the wall-attached iron foil ring (4), the bar magnet chip precursors are filled into the paper tube (5) and stacked with each other to bridge, the bar magnet chip precursors are magnetized by an external magnetic field to convert into bar magnet chips, which are attracted with each other and attract the wall-attached iron foil ring (4) with magnetic force to form the magnet chip bridging layer (9), the cavity section (7) is reserved and the filter section (8) is filled downstream of the cavity section (7).

7. The manufacturing method according to claim 6, **characterized in that**, the side wall of the paper tube (5) corresponding to the cavity section (7) is preset with ventilation holes (6).

## Patentansprüche

1. Eine Zigarette vom Partikeltyp, bei der stromabwärts eines Partikelabschnitts magnetisch versiegelt ist, wobei die Zigarette umfasst: eine Papierröhre (5), eine Dichtungsfolie (1), die das distale Lippenende der Papierröhre (5) blockiert, einen Partikelfüllabschnitt, der unmittelbar stromabwärts der Dichtungsfolie (1) angeordnet ist, wobei der Partikelfüllabschnitt mit gleichmäßig gemischten Tabakpartikeln (2) und Suszeptorpartikeln (3) gefüllt ist, **dadurch gekennzeichnet, dass** eine Magnetchip-Überbrückungsschicht (9) unmittelbar stromabwärts des Partikelfüllabschnitts angeordnet ist, wobei die Magnetchip-Überbrückungsschicht (9) in Umfangsrichtung magnetisch an einem wandbefestigten Eisenfolienring (4) an der Innenfläche der oder innerhalb der Seitenwand der Papierröhre (5) befestigt ist, wobei das Stromabwärtige der Magnetchip-Überbrückungsschicht (9) nacheinander ein Hohlraumabschnitt (7) und ein Filterabschnitt (8) sind.

2. Die Zigarette vom Partikeltyp, bei der stromabwärts eines Partikelabschnitts magnetisch versiegelt ist, gemäß Anspruch 1, wobei die Seitenwand des Hohlraumabschnitts (7) Lüftungslöcher (6) aufweist.

3. Die Zigarette vom Partikeltyp, bei der stromabwärts eines Partikelabschnitts magnetisch versiegelt ist, gemäß Anspruch 1, wobei die Magnetchip-Überbrückungsschicht (9) eine permeable Überbrückungsschicht ist, die durch Stapeln und Überbrücken von Stabmagnetchips gebildet ist.

4. Die Zigarette vom Partikeltyp, bei der stromabwärts eines Partikelabschnitts magnetisch versiegelt ist, gemäß Anspruch 1, wobei der wandbefestigte Eisenfolienring (4) an der Innenfläche oder innerhalb der Seitenwand der Papierröhre (5) vorgefertigt ist, und der an der Wand befestigte Eisenfolienring (4) ein durchgehender oder unterbrochener Ring ist.

5. Die Zigarette vom Partikeltyp, bei der stromabwärts eines Partikelabschnitts magnetisch versiegelt ist, gemäß Anspruch 4, wobei die Papierröhre (5) eine integrale Papierröhre ist und der wandbefestigte Eisenfolienring (4) an der Oberfläche oder innerhalb des Papiermaterials haftet, bevor das Papiermaterial zu der Papierröhre gerollt wird, und mit dem Papiermaterial zu einer Papierröhre gerollt wird, um auf der Papierröhre voreingestellt zu sein.

6. Ein Herstellungsverfahren der Zigarette vom Partikeltyp, bei der stromabwärts eines Partikelabschnitts magnetisch versiegelt ist, gemäß Anspruch 1, **dadurch gekennzeichnet, dass** das Verfahren die folgenden Schritte umfasst: die Papierröhre (5) mit einem an der Seitenwand vorgefertigten, wandbefestigten Eisenfolienring (4) wird bereitgestellt, das distale Lippenende wird mit der Dichtungsfolie (1) versiegelt, die Papierröhre (5) wird aufgerichtet und mit gleichmäßig gemischten Tabakpartikeln (2) und Suszeptorpartikeln (3) befüllt, bis das Partikelniveau die Nähe des wandbefestigten Eisenfolienrings (4) erreicht, die Stabmagnetchip-Vorläufer werden in die Papierröhre (5) gefüllt und miteinander zur Überbrückung gestapelt, die Stabmagnetchip-Vorläufer werden durch ein äußeres Magnetfeld magnetisiert, um sich in Stabmagnetchips umzuwandeln, die sich gegenseitig anziehen und den an der Wand befestigten Eisenfolienring (4) mit magnetischer Kraft anziehen, um die Magnetchip-Überbrückungsschicht (9) zu bilden, der Hohlraumabschnitt (7) wird reserviert und der Filterabschnitt (8) wird stromabwärts des Hohlraumabschnitts (7) gefüllt.

7. Das Herstellungsverfahren gemäß Anspruch 6, **dadurch gekennzeichnet, dass** die dem Hohlraumabschnitt (7) entsprechende Seitenwand der Papierröhre (5) mit Lüftungslöchern (6) voreingestellt ist.

**Revendications**

1. Cigarette de type particules dans laquelle en aval d'une section de particules est scellée magnétiquement, la cigarette comprend un tube de papier (5), un film de scellement (1) qui bloque l'extrémité distale de lèvre du tube de papier (5), une section de remplissage de particules située immédiatement en aval du film de scellement (1), la section de remplissage de particules est remplie de particules de tabac (2) et de particules réceptrices (3) uniformément mélangées, **caractérisée en ce que**, une couche de pontage à puces magnétiques (9) est située immédiatement en aval de la section de remplissage de particules, la couche de pontage à puces magnétiques (9) est fixée magnétiquement de manière circonférentielle à un anneau en feuille de fer fixé à la paroi (4) sur la surface intérieure ou à l'intérieur de la paroi latérale du tube de papier (5), l'aval de la couche de pontage à puces magnétiques (9) est constitué successivement d'une section de cavité (7) et d'une section de filtre (8).

2. La cigarette de type particules dans laquelle en aval d'une section de particules est scellée magnétiquement selon la revendication 1, dans laquelle la paroi latérale de la section de cavité (7) comporte des trous d'aération (6).

3. La cigarette de type particules dans laquelle en aval d'une section de particules est scellée magnétiquement selon la revendication 1, dans laquelle la couche de pontage à puces magnétiques (9) est une couche de pontage perméable formée par empilage et pontage de puces magnétiques en forme de barre.

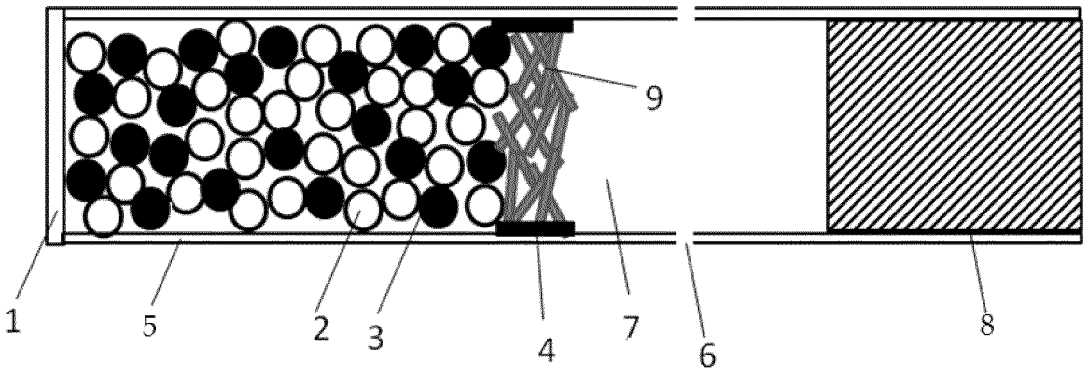
4. La cigarette de type particules dans laquelle en aval d'une section de particules est scellée magnétiquement selon la revendication 1, dans laquelle l'anneau de feuille de fer fixé à la paroi (4) est préfabriqué sur la surface intérieure ou à l'intérieur de la paroi latérale du tube de papier (5), et l'anneau de feuille de fer fixé à la paroi (4) est un anneau continu ou discontinu.

5. La cigarette de type particules dans laquelle en aval d'une section de particules est scellée magnétiquement selon la revendication 4, dans laquelle le tube de papier (5) est un tube de papier intégral, et l'anneau de feuille de fer fixé à la paroi (4) est collé à la surface ou à l'intérieur du matériau de papier avant que le matériau de papier ne soit roulé dans le tube de papier et est roulé avec le matériau de papier dans le tube de papier pour être préréglé sur le tube de papier.

6. Procédé de fabrication de la cigarette de type particules dans laquelle en aval d'une section de parti-

cules est scellée magnétiquement selon la revendication 1, **caractérisé en ce que** le procédé comprend les étapes suivantes : le tube de papier (5) avec un anneau de feuille de fer (4) préfabriqué sur la paroi latérale est fourni, l'extrémité distale de lèvre est scellée avec le film d'étanchéité (1), le tube de papier (5) est érigé et rempli de particules de tabac (2) et de particules réceptrices (3) uniformément mélangées jusqu'à ce que le niveau de particules atteigne la proximité de l'anneau de feuille de fer (4) fixé à la paroi, les précurseurs de puces magnétiques en forme de barre sont remplis dans le tube de papier (5) et empilés les uns avec les autres pour former un pont, les précurseurs de puces magnétiques en forme de barre sont magnétisés par un champ magnétique externe pour se transformer en puces magnétiques en forme de barre, qui sont attirées les unes par les autres et attirent l'anneau de feuille de fer (4) fixé à la paroi avec une force magnétique pour former la couche de pontage de puces magnétiques (9), la section de cavité (7) est réservée et la section de filtre (8) est remplie en aval de la section de cavité (7).

**7.** Procédé de fabrication selon la revendication 6, **caractérisé en ce que** la paroi latérale du tube de papier (5) correspondant à la section de cavité (7) est préréglée avec des trous d'aération (6).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## REFERENCES CITED IN THE DESCRIPTION

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