

Heat-not-burn Cigarette Filter and Heat-not-burn Cigarette

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority to Chinese Patent Application No. 201711284850.9, filed on December 7, 2017 with the State Intellectual Property Office (SIPO) of the People's Republic of China and entitled "Heat-not-burn Cigarette Filter and Heat-not-burn Cigarette", the contents of which are herein incorporated by reference in their entirety.

Technical Field

The present disclosure relates to the technical field of cigarette processing and manufacturing, and particularly to a heat-not-burn cigarette filter and a heat-not-burn cigarette.

Background Art

With the increasing smoking control efforts by governments of various countries and the increasing attention paid by people to health, depending on the conventional paper cigarette, the space for acquiring profit growth of the tobacco industry is also shrinking, therefore, it is a necessary choice to actively research and develop a novel tobacco product with a reduced amount of release of harmful ingredients of tobaccos.

For the heat-not-burn cigarette, tobacco shreds are heated (about 300 °C) by a special heat source, and thus are merely heated but do not burn, then the temperature of the tobacco shreds is far lower than that of the conventional cigarette, the harmful chemical ingredients and the bio-toxicity of the smoke are greatly reduced, and the harmful ingredients produced by high-temperature burning and pyrolysis of the tobaccos can be reduced. Meanwhile, different from the smoldering of the conventional cigarette, the tobacco shreds of the heat-not-burn cigarette are in a non-heated state during pause of smoking, therefore, side-stream smoke and environmental smoke are also greatly reduced.

In view of the unique advantages of the heat-not-burn type cigarettes, Philip Morris Companies Inc., British American Tobacco Co., Ltd., Reynolds tobacco Company, etc. carried out systematic researches on relevant technologies of the heat-not-burn type cigarettes, and especially performed intellectual property layout regarding the heat-not-burn type cigarettes. In recent years, domestic tobacco companies in China carried out a lot of researches in the aspect of the heat-not-burn cigarettes, for example, patents such as CN103584288A, CN103859597A, CN203735475U, etc. put more emphasis on the design of a heating apparatus and on the cooperation between the cigarette and the heating apparatus, while there are less researches in the aspect of cigarette structure design. The existing patents such as

201310111258, 201310143670, etc. disclose heat-not-burn tobacco products, in which the whole cigarette holder and the heating apparatus are both in a one-piece structure.

Disclosure of the Invention

The present disclosure provides a heat-not-burn cigarette filter and a heat-not-burn cigarette. The heat-not-burn cigarette filter effectively improves the smoke throughput and the smoke concentration, meanwhile reduces the smoke temperature, and improves the smoking quality of the cigarette, etc.

A heat-not-burn cigarette filter includes a first portion and a second portion which are connected with each other, wherein the first portion is a filter rod, the second portion comprises at least one hollow portion and at least one cooling portion, the cooling portion comprises at least one through hole which has a cavity and is used as a passage, and the hollow portion has a middle part in a through cavity structure, and the cavity structure has a diameter greater than or equal to that of the through hole.

Further, the filter rod is a cellulose acetate filter rod.

Further, the cooling portion includes a plurality of through holes.

Further, the cooling portion has a length of 5~30 mm.

Further, the hollow portion has a length of 5~30 mm.

Further, the hollow portion and the cooling portion are in a one-piece structure of the same material; the cross section area of the cavity structure of the hollow portion is greater than or equal to the cross section area of the through hole.

Further, the through hole has a diameter of 0.2~7 mm.

Further, the cavity structure of the hollow portion has a diameter of 2~7 mm.

The present disclosure further provides a heat-not-burn cigarette, including the above heat-not-burn cigarette filter and a tobacco rod, wherein the tobacco rod is connected to the second portion of the heat-not-burn cigarette filter, and tipping paper is wrapped outside the heat-not-burn cigarette filter and the tobacco body.

Further, the tobacco rod is formed by several regularly- and orderly-arranged tobacco shreds along the radial direction of the cigarette.

Compared with the prior art, the heat-not-burn cigarette filter and the heat-not-burn cigarette of the present disclosure have the following beneficial effects:

(1) The heat-not-burn cigarette filter of the present disclosure includes the filter rod, the cooling portion, and the hollow portion. When smoking, after the

tobacco portion is heated by a corresponding heater, smoke passes through the hollow portion, the cooling portion, and the filter rod, effectively improving a passage quantity of the smoke and the smoke concentration, meanwhile reducing the smoke temperature, and improving the smoking quality of the cigarette, etc.

(2) Furthermore, since the plurality of through holes are used in the cooling portion of the heat-not-burn cigarette filter, on the one hand, when the smoke passes through the cooling portion, the contact area with the cooling portion is increased, producing the effect of reducing the smoke temperature, on the other hand, the plurality of through holes greatly increase the smoke throughput, ensuring the richness of smoke volume; besides, the cooling portion uses the polylactic acid polymer material, then when the smoke passes therethrough, no other undesirable odors or a cigarette collapses due to a too high smoke temperature will be caused thereby.

To sum up, the special structure of the present disclosure has the above various advantages and practical values, moreover, no similar method is disclosed or used for the same type of products, thus the present disclosure is indeed innovative, produces good and practical effects, and has improved efficacies compared with the prior art, therefore, it is relatively practical and has wide industrial values.

In order to make it more obvious and easier to understand the above objects, features and advantages of the present disclosure, preferable examples are particularly illustrated in the following to give detail descriptions in conjunction with the accompanying drawings.

Brief Description of Drawings

In order to more clearly illustrate the technical solutions of examples of the present disclosure, figures which are needed in the examples will be introduced below briefly. It should be understood that the figures below merely show some examples of the present disclosure, and therefore should not be considered as limiting the scope. A person ordinarily skilled in the art can also obtain other relevant figures according to these figures, without paying inventive effort.

Fig. 1 is a structural schematic view of a heat-not-burn cigarette of Example 1 of the present disclosure;

Fig. 2 is a structural schematic view of a heat-not-burn cigarette of Example 2 of the present disclosure;

Fig. 3 is a structural schematic view of a heat-not-burn cigarette of Example 3 of the present disclosure;

Fig. 4 is a structural schematic view of a heat-not-burn cigarette of Example 4 of the present disclosure.

Reference signs of main elements:

1-heat-not-burn cigarette;

10-heat-not-burn cigarette filter;

20-tobacco rod;

30-tipping paper;

100-filter rod;

200-cooling portion;

210-through hole;

300-hollow portion.

Detailed Description of Embodiments

In order to facilitate the understanding the present disclosure, a heat-not-burn cigarette filter and a heat-not-burn cigarette will be more comprehensively described below with reference to relevant accompanying drawings. Preferred examples of the heat-not-burn cigarette filter and the heat-not-burn cigarette are provided in the accompanying drawings. However, the heat-not-burn cigarette filter and the heat-not-burn cigarette can be implemented in many different forms, but not limited to the examples described herein. In contrast, these examples are provided for the purpose to make the disclosure of the heat-not-burn cigarette filter and the heat-not-burn cigarette more thorough and more comprehensive.

In the following, the term “include” or “can include” which can be used in various examples of the present disclosure indicates the presence of the disclosed function, operation or element, and does not limit the addition of one or more functions, operations or elements. Besides, terms such as “include”, “have” and cognates thereof used in various examples of the present disclosure are merely intended to indicate specific features, numbers, steps, operations, elements, components or combinations of the foregoing, and should not be construed as initially excluding the possibility of the presence of one or more other features, numbers, steps, operations, elements, components or combinations of the foregoing or the possibility of the addition of one or more other features, steps, operations, elements, components or combinations of the foregoing.

In the various examples of the present disclosure, the expression “or” or “at least one of A or/and B” includes any combination or all combinations of the literally listed. For example, the expression “A or B” or “at least one of A or/and B” can include A, can include B or can include both A and B.

In the description of the present disclosure, it should be understood that orientational or positional relationships indicated by terms such as

“longitudinal”, “transverse”, “upper”, “lower”, “front”, “back”, “left”, “right”, “vertical”, “horizontal”, “top”, “bottom”, “inner”, and “outer” are based on orientational or positional relationships shown in the figures, merely for facilitating describing the present disclosure and simplifying the description, rather than indicating or implying that the indicated devices or elements have to be in the specific orientation or configured and operated in specific orientation, therefore, they should not be construed as limiting the present disclosure. Besides, terms such as “first”, “second”, and “third” are merely for distinctive descriptions, but should not be construed as indicating or implying importance in relativity.

In the description of the present disclosure, descriptions with reference to terms such as “one example”, “some example”, “illustration”, “specific illustration”, or “some examples” indicates that specific features, structures, materials or characteristics described in combination with this example or illustrative description are included in at least one example or illustration of the present disclosure. In the present description, illustrative expression of the above terms does not necessarily refer to the same example or illustration. Moreover, the specific features, structures, materials or characteristics described can be combined in any appropriate manner in any one or more examples or illustrations.

In the description of the present disclosure, it should be indicated that unless otherwise specified and defined, terms “mount”, “join”, and “connect” should be construed in a broad sense. For example, the connection can be mechanical connection or electrical connection; it also can be internal communication between two elements; it can be direct connection or indirect connection through an intermediate medium. For a person ordinarily skilled in the art, specific meanings of the above terms can be understood according to specific circumstances. Unless otherwise defined, all terms (including technical terms and scientific terms) used herein have the same meaning as that generally understood by a person ordinarily skilled in the art of the various examples of the present disclosure. The terms (such as the terms defined in dictionaries commonly used) shall be construed as having the same meaning as that in the context of relevant technical field and shall not be construed as having an ideal meaning or overformal meaning, unless clearly defined in various examples of the present disclosure.

Referring to Fig. 1 to Fig. 4, the present disclosure provides a heat-not-burn cigarette filter 10, including a first portion and a second portion connected with each other, wherein the first portion is a filter rod 100, and the second portion includes at least one cooling portion 200 and at least one hollow portion 300. The cooling portion 200 includes at least one through hole 210, and the middle part of the hollow portion 300 is in a through cavity structure.

The heat-not-burn cigarette filter of the present disclosure includes the filter rod 100, the cooling portion 200 and the hollow portion 300. When smoking, after a tobacco portion is heated by a corresponding heater, smoke passes through the hollow portion 300, the cooling portion 200, and the filter rod 100, effectively improving the smoke throughput and the smoke concentration, meanwhile reducing the smoke temperature, and improving the smoking quality of the cigarette, etc.

Preferably, the filter rod 100 is a cellulose acetate filter rod 100.

Cellulose acetate is a thermoplastic resin obtained through esterification under the effect of a catalyst, with acetic acid as a solvent and acetic anhydride as an acetylation agent. The cellulose acetate is a type of cellulose organic ester. The cellulose acetate, as a porous membrane material, has characteristics such as high selectivity, great water flux, environmental protection and non-toxicity, and simple processing, etc.

Of course, the filter rod 100 can also be other composite filter rods, for example, a composite filter rod of activated carbon and cellulose acetate or the like.

Preferably, the cooling portion 200 includes a plurality of through holes 210 which has a cavity and is used as a passage, for example, 3, 4, 6, or 7 through holes. More preferably, the plurality of through holes 210 are uniformly distributed in the cooling portion.

The section of the above through hole 210 preferably is in a circular shape, with a diameter of preferably 0.2~7 mm, for example, 0.2 mm, 0.7 mm, 1.2 mm, 1.8 mm, 2.5 mm, 3 mm, 4 mm, 5 mm, 6 mm or 7 mm, etc. Of course, the section of the through hole 210 also can be in a square shape or other shapes.

It should be understood that since the plurality of through holes 210 are used in the cooling portion 200, on the one hand, when the smoke passes through the cooling portion 200, the contact area with the cooling portion 200 is increased, producing the effect of reducing the smoke temperature, on the other hand, the plurality of through holes 210 greatly increase the smoke throughput, ensuring the richness of smoke volume.

It should be indicated that when the cooling portion 200 includes one through hole 210, preferably, this through hole 210 is located right in the middle of the cooling portion, and this through hole 210 has a diameter of 4~7.8 mm, such as 4 mm, 5 mm, 6 mm, 7 mm or 7.8 mm, etc.

Preferably, the cooling portion 200 and the hollow portion 300 have a length of 5~30 mm, for example, 5 mm, 10 mm, 15 mm, 20 mm, 25 mm or 30 mm, etc.

Preferably, the cooling portion 200 and the hollow portion 300 are both in a cylindrical shape, and the cooling portion 200 has a diameter of 5~8 mm, for example, 5 mm, 6 mm, 7 mm or 8 mm, etc.

Preferably, the hollow portion 300 has a diameter of 5~8 mm, for example, 5 mm, 6 mm, 7 mm or 8 mm, etc.

Preferably, the cavity structure of the hollow portion 300 has a diameter of 2~7 mm, for example, 2 mm, 3 mm, 4 mm, 5 mm, 6mm or 7mm, etc.

Preferably, the hollow portion 300 and the cooling portion 200 are in a one-piece structure of the same material; and the cross section area of the cavity structure of the hollow portion 300 is greater than or equal to the cross section area of the through hole 210.

Of course, the hollow portion 300 and the cooling portion 200 can also be in structures of different materials. The cooling portion 200 can use a polylactic acid material or a paper material, and the hollow portion 300 can use a cellulose acetate material.

It should be indicated that the cooling portion 200 uses a polylactic acid high-polymer material, then when the smoke passes therethrough, no other undesired odors or the cigarette collapses due to too high smoke temperature will be caused thereby.

Referring to Fig. 1 to Fig. 4, the present disclosure further provides a heat-not-burn cigarette 1, including the above heat-not-burn cigarette filter and a tobacco rod 20, wherein the tobacco rod 20 is connected to the second portion of the heat-not-burn cigarette filter, and tipping paper is wrapped outside the heat-not-burn cigarette filter and the tobacco body.

Preferably, the tobacco rod 20 is formed by making several tobacco shred rods which are regularly and orderly arranged stay close to each other in the radial direction of the cigarette.

It should be indicated that tobacco leaves used by the tobacco rod 20 can be artificial reconstituted tobacco leaves such as papermaking-process reconstituted tobacco leaves, dry-process reconstituted tobacco leaves, slurry-process reconstituted tobacco leaves, rolling-process reconstituted tobacco leaves or the like.

It should be indicated that, by orderly arranging the tobacco shred rods, orderly-arranged gaps are also formed between the tobacco shred rods, which, greatly improves the porosity as compared with disorderly-arranged rods of tobacco shreds, and ensures good air permeability and airflow uniformity inside the cigarettes; and the orderly-arranged tobacco shred rods and the orderly-arranged gaps formed thereby provide approximately straight airflow passage for circulation of smoke, which reduces the smoking

resistance and the adsorption property of the tobacco shreds to the smoke, and improves the smoke passing efficiency.

Example 1

As shown in Fig. 1, a heat-not-burn cigarette 1 includes a heat-not-burn cigarette filter 10 and a tobacco rod 20. The heat-not-burn cigarette filter 10 includes a cellulose acetate filter rod 100, a cooling portion 200, and a hollow portion 300 connected in sequence. The cooling portion 200 includes a plurality of through holes 210, and the middle part of the hollow portion 300 is in a through cavity structure. The wall thickness of the hollow portion 300 is slightly greater than that of the outer layer of the cooling portion 200. The cooling portion 200 uses a polylactic acid material, and the hollow portion 300 uses a cellulose acetate material.

The tobacco rod 20 is connected to the hollow portion 300, and the heat-not-burn cigarette filter and the tobacco rod 20 are wrapped with tipping paper to form an entire cigarette.

When the above heat-not-burn cigarette 1 is used for smoking, a tobacco end is inserted into a corresponding heating device to be heated. After the heating is completed, a filter section of cellulose acetate is smoked. The smoke passes through the hollow portion 300. The hollow portion 300 not only has a function of gathering together the smoke, but also has a function of storing the smoke, ensuring the richness of the smoke. The smoke, after temporarily staying at a cavity position of the hollow portion 300, quickly passes through the cooling portion 200. The plurality of through holes 210 of the cooling portion 200 increase the contact area of the smoke with the cooling portion 200, and reduce the temperature of the smoke, then lips of a smoker are not easy to be scalded, meanwhile, the configuration of the plurality of through holes 210 can enable the smoke to pass through quickly, reducing the pressure drop across two ends of the cigarette, reducing the loss of the smoke, and improving the smoking quality.

Example 2

As shown in Fig. 2, a heat-not-burn cigarette 1 includes a heat-not-burn cigarette filter 10 and a tobacco rod 20. The heat-not-burn cigarette filter 10 includes a cellulose acetate filter rod 100, a cooling portion 200 and a hollow portion 300 connected in sequence. The cooling portion 200 includes a through hole 210, and the middle part of the hollow portion 300 is in a through cavity structure. The wall thickness of the hollow portion 300 is slightly greater than that of the cooling portion 200. The cooling portion 200 uses a paper material, and the hollow portion 300 uses a cellulose acetate material.

The tobacco rod 20 is connected to the hollow portion 300, and the heat-not-burn cigarette filter and the tobacco rod 20 are wrapped with tipping paper to form an entire cigarette.

When the above heat-not-burn cigarette 1 is used for smoking, a tobacco end is inserted into a corresponding heating means to be heated. After the heating is completed, a filter section of cellulose acetate is smoked. The smoke passes through the hollow portion 300. After the hollow portion 300 gathers together the smoke, the smoke passes through the cooling portion 200. The cooling portion 200 uses a cavity structure of a paper material as a smoke storing chamber, ensuring the richness of the smoke volume, increasing the smoke concentration, and improving the smoking quality.

Example 3

As shown in Fig. 3, a heat-not-burn cigarette 1 includes a heat-not-burn cigarette filter 10 and a tobacco rod 20. The heat-not-burn cigarette filter 10 includes a cellulose acetate filter rod 100 and a cooling portion 200 and a hollow portion 300 which are integrally molded. The cooling portion 200 includes a plurality of through holes 210, and the middle part of the hollow portion 300 is a through cavity structure. The cooling portion 200 is located in a middle position of the hollow portion 300.

The cellulose acetate filter rod 100 is connected to the first end of the hollow portion 300, the tobacco rod 20 is connected to the second end of the hollow portion 300, and the heat-not-burn cigarette filter 10 and the tobacco rod 20 are wrapped with tipping paper to form an entire cigarette.

When the above heat-not-burn cigarette 1 is used for smoking, a tobacco end is inserted into a corresponding heating means to be heated. After the heating is completed, a filter section of cellulose acetate is smoked. The smoke passes through a second end of the hollow portion 300. The smoke passes, after being gathered together, through the cooling portion 200, then passes through the first end of the hollow portion 300, not only reducing the smoke temperature and increasing the smoke concentration, but also omitting one recombination when the cigarettes are rolled and recombined, and thereby improving the production efficiency and reducing the cost of the cigarette.

Example 4

As shown in Fig. 4, a heat-not-burn cigarette 1 includes a heat-not-burn cigarette filter 10 and a tobacco rod 20. The heat-not-burn cigarette filter 10 includes a cellulose acetate filter rod 100 and cooling portions 200 and a hollow portion 300 which are integrally molded. The cooling portions 200 include a plurality of through holes 210, and the middle part of the hollow portion 300 is in a through cavity structure. The cooling portions 200 are located at two ends of the hollow portion 300.

The cellulose acetate filter rod 100 and the tobacco rod 20 are respectively connected to the cooling portion 200 at two ends of the hollow portion 300, and the heat-not-burn cigarette filter and the tobacco rod 20 are wrapped with tipping paper to form an entire cigarette.

When the above heat-not-burn cigarette 1 is used for smoking, a tobacco end is inserted into a corresponding heating means to be heated. After the heating is completed, a filter section of cellulose acetate is smoked. The smoke passes through the cooling portion 200 at one end of the hollow portion 300, then passes through the hollow portion 300, then passes through the cellulose acetate filter rod 100 at the other end of the hollow portion 300, not only reducing the smoke temperature and increasing the smoke concentration, but also omitting one recombination when the cigarettes are rolled and recombined, thereby improving the production efficiency, and reducing the cost of the cigarette.

Although a lot of terms representing structures, for example, "filter rod", "cooling portion", and "hollow portion" and so on, are used in the above, the possibility of using other terms is not excluded. These terms are merely used for describing and explaining the essence of the present disclosure more conveniently; and to construe them as any additional limitations is against the spirit of the present disclosure.

The above-mentioned are merely for specific embodiments of the present disclosure, while the scope of protection of the present disclosure is not limited thereto. Any variations or substitutions, readily occurring to any skilled person familiar with the present technical field, should fall within the scope of protection of the present disclosure.

Claims:

1. A heat-not-burn cigarette filter (10), comprising a first portion and a second portion which are connected with each other, the first portion being a filter rod (100), the second portion comprising at least one hollow portion (300) and at least one cooling portion (200), the cooling portion (200) comprising at least one through hole (210), which has a cavity and is used as a passage, and the hollow portion (300) having a middle part in a through cavity structure which has a diameter greater than a diameter of the through hole (210), such that a cross section area of the cavity structure of the hollow portion (300) is greater than a cross section area of the through hole (210), characterized in that the hollow portion (300) and the cooling portion (200) are in a one-piece structure of a same material.
2. The heat-not-burn cigarette filter (10) of claim 1, characterized in that the filter rod (100) is a cellulose acetate filter rod.
3. The heat-not-burn cigarette filter (10) of any one of claims 1 to 2, characterized in that the cooling portion (200) comprises a plurality of through holes (210).
4. The heat-not-burn cigarette filter (10) of any one of claims 1 to 3, characterized in that the cooling portion (200) has a length of 5-30 mm.
5. The heat-not-burn cigarette filter (10) of any one of claims 1 to 4, characterized in that the hollow portion (300) has a length of 5-30 mm.
6. The heat-not-burn cigarette filter (10) of claim 3, characterized in that the through hole (210) has a diameter of 0.2-7 mm.
7. The heat-not-burn cigarette filter (10) of any one of claims 1 to 6, characterized in that the cavity structure of the hollow portion (300) has a diameter of 2-7 mm.
8. A heat-not-burn cigarette (1), characterized by comprising the heat-not-burn cigarette filter (10) of any one of claims 1 to 7 and a tobacco rod (20), the tobacco rod (20) being connected to the second portion of the heat-not-burn cigarette filter (10), and tipping paper (30) being wrapped outside the heat-not-burn cigarette filter (10) and a tobacco body.
9. The heat-not-burn cigarette (1) of claim 8, characterized in that the tobacco rod (20) is formed by several tobacco shred rods which are arranged, regularly and in order, in a radial direction of a cigarette.