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(54) **TUBE WITH ACTIVE FILTER**

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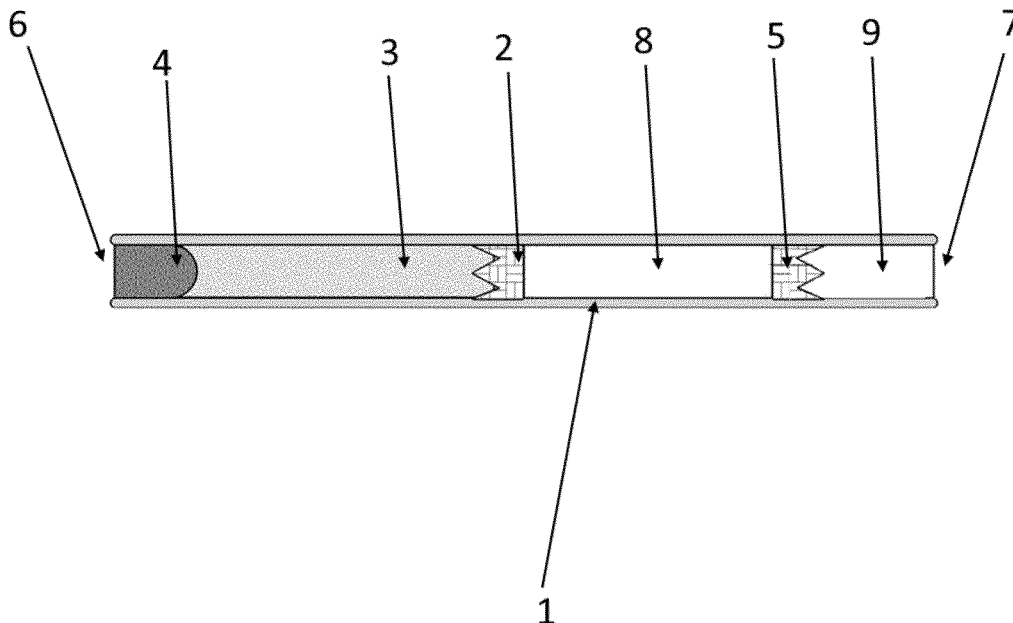
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(57) **ABSTRACT**

(30) **Foreign Application Priority Data**

Sep. 30, 2021 (PL) W.130299

A reusable active filter tube includes a tube (1) inside which there is a carbon filter (3) and a sponge filter (4), that when viewed from the first end (6) of the tube placed in in the mouth of the user, it includes successively: a sponge filter (4), an adjacent carbon filter (3), a second silver screen (2) and a first silver screen (5), between the first silver screen (5) and the second silver screen (2) is a space forming the chamber (8), and between the first silver screen (5) and the second end (7) of the tube (1) there is a chamber (9) in which the smoking material is placed.



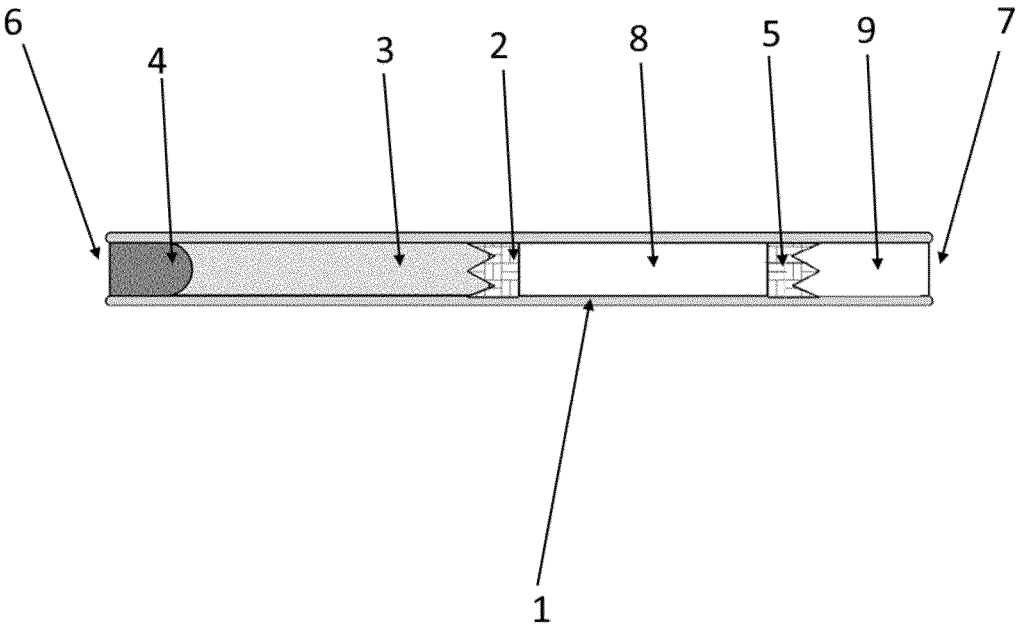


Fig. 1

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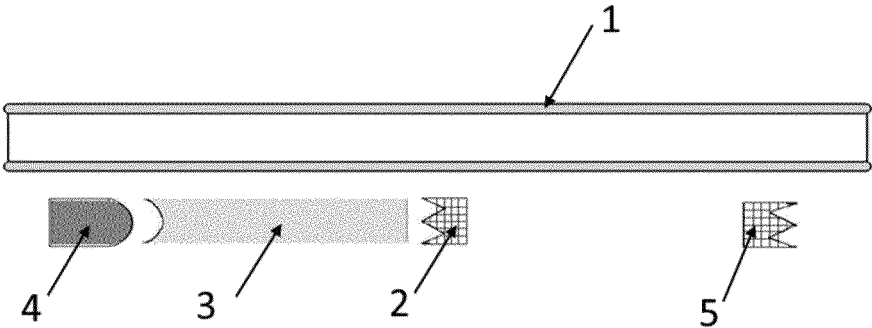


Fig.2

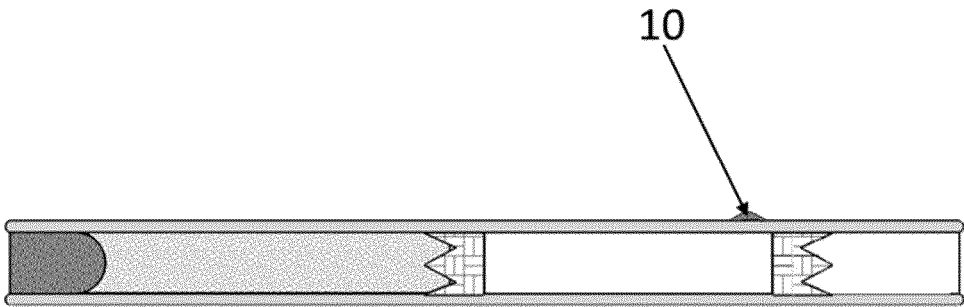


Fig.3

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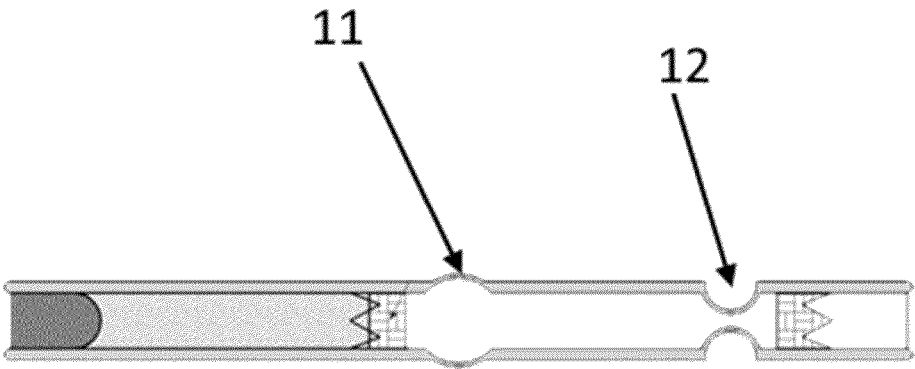


Fig. 4

TUBE WITH ACTIVE FILTER

[0001] This application claims priority to Polish utility model application number W.130299 filed on Sep. 30, 2021, the disclosure of which is incorporated herein by reference.

THE FIELD OF TECHNOLOGY

[0002] This disclosure relates to a reusable active filter tube. The tube is intended for consumers of medical marijuana, CBD and other herbs, as well as tobacco.

BACKGROUND

[0003] There are many types of tubes on the European market. Tubes are distinguished primarily by the shape, dimensions and type of material they are made of. Currently, the most popular tube is a soda glass tube made as a straight sleeve that widens at one end. Such a tube is made of thin glass and does not provide any filter protection to user and is therefore the most harmful to the user. There are also tubes containing a filter, for example: tubes filled with filter glass beads.

[0004] German patent DE1792785 shows a glass or plastic tube for smoking cigarettes. Such a tube contains an internal filter in the form of a fabric, e.g. cotton or cardboard with a filtering or absorbent material, e.g. activated carbon or diatomaceous earth, deposited thereon. Such a tube ends on one side with a tapered mouthpiece and on the other with a part for embedding a cigarette in it.

[0005] Chinese patent CN2438342 shows a cigarette holder containing: a mouthpiece, a vent tube, a moisture trap net, an activated carbon filter section, a hollow tube and an end-closure stainless steel sleeve in which the cigarette is placed. All the elements of the handle, except for the sleeve, are made of plastic - colored or transparent. In such a holder, the user draws smoke cleaned by the carbon filter, and at the same time other people in the environment are protected against the smoke coming directly from the cigarette and the ash that remains in the sleeve during smoking.

[0006] An alternative tube with filter has been proposed in U.S. Pat. application US20040045566. The described filter consists of several successive parts (looking in the direction of the user sucks the smoke in): a cellulose partition, a filter part with a loosely packed antioxidant filter material used to remove free radicals from smoke, another partition - from cellulose acetate, a filter part from cellulose acetate containing minerals that absorb harmful solids and smoke gases, another cellulose partition. This filter can then be placed in the tube or directly in the pipe.

[0007] The above-described arrangements offer various solutions to the technical problem of how to provide a tube with a filter element that would protect a user from the harmful effects of smoke, including inhaled tar and heavy metals, and that could be reusable. Most of the described solutions, however, are adapted to smoking finished cigarettes, and not loose, unpackaged substances such as herbs, CBD or medical marijuana, and therefore, they do not address a number of issues related to smoking such loose substances.

[0008] Surprisingly, it has been found that these problems can be solved by using a new, unknown by technical position tube design, which is an improved alternative to tradi-

tional commercially available barrels and can be used for smoking both traditional cigarettes and loose products.

[0009] The tube according to the present application is, above all, a reusable tube - it can be used until the external part of the tube is mechanically damaged. All elements contained inside the tube can be easily replaced by new ones.

[0010] What's more, thanks to the presence of two different types of filters and metal silver screens, it allows for the simultaneous capture of solid substances that could get into the user's respiratory tract and cause irritation or even burns, and the capture of harmful substances such as tar and heavy metals present in the smoke with high efficiency. These features contribute to improving the quality of the inhaled smoke, as well as providing user protection and improving the comfort of consumption.

[0011] At the same time, the tube is as easy to use as traditional tubes available on the market - just introduce the consumed product at one end of the tube, set it on fire and inhale the smoke with the other end of the tube.

SUMMARY

[0012] The object of the disclosure is a reusable active filter tube containing a tube inside which there is a carbon filter and a sponge filter. Looking from the first end of the tube placed in the user's mouth, it comprises, in turn, a sponge filter, a filter adjacent to it coal, a second silver screen, and a first silver screen, wherein a cavity is provided between the first silver screen and the second silver screen to a chamber, and between silver screens of the tube on the end there is a chamber in which the smoking material is placed.

[0013] The tube is equipped with anti-slip elements.

[0014] The anti-skid elements are in the form of recesses or protrusions.

[0015] The screens are made of steel and have a mesh size of 0.3 mm.

[0016] The sponge filter has a density of 45-60 PPI.

[0017] The carbon filter is in the form of molded activated carbon with a particle size of 2-2.5 mm.

[0018] The chamber in which the smoking material is placed has a length of 20 mm.

[0019] The tube has an inner diameter of 9-20 mm.

DESCRIPTION

[0020] The tube body (also referred as a tube) according to the present disclosure can be made of any material, but from the point of view of industrial applicability it is made of glass, for example borosilicate glass. For practical reasons, it is the best if it is made of transparent material - it makes it easier to determine the condition of the elements inside. In one variation of the pattern, the body is shaped like a straight tube open at both ends. For example, the length of such a tube is approximately 125 mm and the outer diameter is in the range 9-20 mm or in the range 9-16 mm, for example 11 mm.

[0021] In one variation of the pattern, the tube body is provided on its outer periphery with anti-skid elements, such as projections that can be made by locally widening the diameter of the tube, and recesses that can be made by locally narrowing the diameter of the tube. These elements prevent the tube from slipping out of the user's hand.

[0022] The tube has two open ends - the first end, placed in the user's mouth, and the second end, where the smoking material is introduced. The patterned tube can be used to

smoke cigarettes as well as loose, unpackaged substances such as herbs, CBD or medical marijuana.

[0023] Inside the tube there are two silver screens with a diameter corresponding to the inner diameter of the tube. These screens are shaped like a crown and can be made of any material, for example metal. The first silver screen is placed closer to the end of the tube where the smoking material is introduced, and the second silver screen is adjacent to the carbon filter that an empty chamber is formed between the silver screens inside the tube.

[0024] The main function of the silver screens is to capture solid substances that could detach from the burnt material and get into the respiratory tract of the user or, if a filter is used, could cause its clogging. In addition, these screens break down the smoke, allowing it to be better cleaned further in the tube. In addition, the first screen serves as a support for the introduced material, preventing it from being too deeply introduced, which could cause problems with its ignition.

[0025] As standard, the first silver screen is located approx. 20 mm from the other end of the tube, through which the said smoking material is introduced.

[0026] The empty space inside the tube between the screens reduces the temperature of the smoke, which reduces the risk of burns to the user.

[0027] The optimal mesh size of the sieves is approx. 0.3 mm. The mesh size of the silver screen is selected so as to protect the user against tear-off fragments of the burnt material, even in the case of using very fragmented substances, and at the same time not to significantly increase the flow resistance and to allow free air intake along with the smoke.

[0028] Behind the second silver screen in the tube, according to the pattern, there is a carbon filter. The carbon filter consists of high-purity activated carbon in an amount of, for example, 1000 mg. The filter may be in the form of molded activated carbon with an average particle size of about 2-2.5 mm. This filter is used to clean smoke from tar and heavy metals with high efficiency.

[0029] Behind the carbon filter, at the first end of the tube, there is another sponge filter, for example with a density of 45-60 PPI, for final cleaning of the smoke from the remaining tar and heavy metals.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] The subject of the disclosure is presented in the drawings, where:

[0031] FIG. 1 shows the tube with an active filter in cross-section,

[0032] FIG. 2 shows the tube of FIG. 1 in an unfolded form, also in cross-section,

[0033] FIG. 3 shows a version of the tube with an active filter in a cross-section,

[0034] FIG. 4 shows another variation of the active filter tube in cross-section.

DETAILED DESCRIPTION

[0035] FIG. 1 shows the tube with an active filter in cross section. FIG. 2 shows the same tube in an unfolded form.

[0036] The active filter tube according to the pattern includes a tube **1** (body) in which a sponge filter **4** with a density in the range of 45 to 60 PPI, a carbon filter **3**, a second silver screen **2** and a first silver screen **5** are placed. user, in the pipe **1** there are successively a sponge filter **4**, a carbon filter **3** located directly behind it, a second screen **2** adjacent to the carbon filter **3**, a chamber **8** limited on one side by a second screen **2**, and on the other hand by a first screen **5** and a chamber **9** in which the smoking material is placed, located at the other end **7** of the tube **1**.

[0037] The diameter of the tube **1** is 11 mm and its length is 125 mm. The tube is made of borosilicate glass. The first silver screen **5** is placed at a distance of 20 mm from the second end **7** of the tube **1**.

[0038] FIG. 3 shows another variant of the tube according to the pattern. In this variant, the tube has the same parameters and contains all the elements described in relation to the variant shown in FIGS. 1 and 2, with the difference that additionally the tube **1** is provided with an anti-skid element **10** in the form of a projection on the outer surface of the tube.

[0039] FIG. 4 shows yet another variant of the tube according to the pattern in a schematic and real view, respectively. The tube has the same parameters as shown in FIGS. 1-3, but differs from the tube of FIG. 3 in the type of anti-skid elements. In this variant, the tube comprises two such elements - respectively a widening **11** (projection) of the tube and a narrowing **12** (recess) of the tube **1**, located in the area of the tube **1** between the first screen **2** and the second screen **5**.

1. A reusable active filter tube containing a tube (**1**) inside which there is a carbon filter (**3**) and a sponge filter (**4**), characterized in that, when viewed from the first end (**6**) of the tube placed in the user's mouth, it successively, a sponge filter (**4**), an adjacent carbon filter (**3**), a second silver screen (**2**) and a first silver screen (**5**), with an empty space forming a chamber between the first silver screen (**5**) and the second silver screen (**2**). (**8**), and between the first silver screen (**5**) and the second end (**7**) of the tube (**1**) there is a chamber (**9**) in which the smoking material is placed.

2. The tube according to claim 1, characterized in that the tube (**1**) is provided with anti-skid elements.

3. The tube according to claim 1, characterized in that the anti-skid elements (**5**) are in the form of recesses (**12**) or protrusions (**11**, **10**).

4. The tube according to claim 1, characterized in that the screens (**2**, **5**) are made of steel and have a mesh size of 0.3 mm.

5. The tube according claim 1, characterized in that the sponge filter (**4**) has a density of 45-60 PPI.

6. The tube according to claim 1, characterized in that the carbon filter (**3**) is in the form of formed activated carbon with a particle size of 2-2.5 mm.

7. The tube according to claim 1, characterized in that the chamber (**9**) in which the smoking material is placed has a length of 20 mm.

8. The tube according to claim 1, characterized in that the tube (**1**) has an internal diameter in the range of 9-20 mm.

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