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# Smoke-free cigarettes

The invention relates to a smoke-free cigarette, in accordance with the generic term of Claim 1.

In DE 103 21 379 A1, which forms the basis of the generic term of Claim 1, a smoke-free cigarette is described, designed with a reusable cigarette body with a thermoplastic sheathing with a vapour deposited coating which retro-reflects heat and is designed with a heat source, which is incorporated into the sheathing in such a way that air channels arise. A non-reusable mouthpiece contains a nicotine aroma reserve and a filter.
Heat released from the heat source warms the air sucked through the air duct by a consumer, which warms the nicotine aroma reserve, in this way releasing the nicotine and aromatic substances located in the reserve, which are taken up by the consumer or smoker after passing through the filter. On account of the smoke-free nicotine feed, intense enjoyment of nicotine is possible without residues of combustion products and without affecting the surrounding area.

DE 297 13 866 U1 describes an electrical hot air adapter for cigarettes which permits smoke-free enjoyment of a cigarette, since the cigarette is inserted into a sleeve-shaped adapter containing a warming chamber and a heating element. A draught taken by a smoker is heated in the warming chamber and by the heating element, reaching the cigarette, so that the aromatic compounds are released from the pleasure-giving stimulant without it burning.

DE 199 35 706 A1 describes a smoke-free cigarette for which the cigarette body contains a battery-heated filament, which heats the air drawn in by a smoker. The drawn in air passes through a replaceable nicotine filter, in which the nicotine is released by the warmed air so that it can be inhaled by the consumer.

DE 40 06 887 A1 describes a smoke-free cigarette, the body of which contains a capsule as heat source, in which a heat-generating reaction may be initiated.

An aerosol may be released by the heat, which is inhalable through a filter mouthpiece.

A cigarette functioning without combustion is known from DD 298 347 A5, which contains a pleasure-giving stimulant and a heat source to heat the pleasure-giving stimulant which is not based on combustion and which is physically separated from the pleasure-giving stimulant.

The invention forms the basis of creating an affordable and user-friendly possibility which provides smokers with the intense enjoyment of nicotine or the pleasure-giving stimulant with an aroma similar to conventional cigarettes without affecting the surrounding environment through smoking.

This problem was solved with the cigarette body pursuant to Claim 1.

The reusable cigarette body corresponding to the invention which does not contain its own heating source, is affordable, and by warming the warming tube, permits swift heating of the pleasure-giving stimulant for an adequate period.

Subclaims 2 to 5 are directed towards the beneficial extension of the cigarette body corresponding to the invention.

Claim 6 characterises the cigarette corresponding to the invention as a whole, which is extended with the characteristics of Claim 7 in a beneficial way.

Claims 8 to 10 concern a mouthpiece for the cigarette.

Claims 11 to 13 characterise an adapter, through which a cigarette corresponding to the invention may be attached to a heat source.

In designing the adapter in accordance with Claim 12, a cigarette corresponding to the invention may be handled in a similar way to a conventional cigarette.

In particular, the "lighting up" of the cigarette with a lighter is a psychological component, which compares with the usual handling of a conventional cigarette, actually transformed into a smouldering fire.

Claims 14 and 15 characterise a cigarette box in which the mouthpieces provided for a single use may be stored together with the reusable cigarette body.

With the invention, a possibility has been created of maintaining the subjective pleasure of conventional cigarette smoking, and in particular, of avoiding the disturbances to the environment associated with conventional smoking. The cigarette corresponding to the invention may be "lit up" or initiated like a conventional cigarette, in that it is initiated by a lighter. The heat created through the lighter causes the evaporation or release of the pleasure-giving stimulant deposited in the reserve, e.g. nicotine with aromatic substances, which is rapidly ready for enjoyment and which may be enjoyed intensely. The harmful substances of conventional smoking, such as tar and combustion products, are absent from this enjoyment. Since no smoke is emitted in the surroundings, there is no passive smoking by individuals located in the surrounding area. If the smoke-free cigarette corresponding to the invention cools down with longer use, without the pleasure-giving stimulant being consumed, it may easily be put to use again through renewed "lighting up" with the lighter, so that the pleasure-giving stimulant may be consumed.

The invention shall be illustrated below on the basis of schematic plans, by way of example, and with the mention of further detail.

The figures represent:

Fig. 1 in an exploded illustration of a cross section through a mouthpiece, a cigarette body and an adapter,
Fig. 2 a side view of a cigarette lighter,

Fig. 3 A view from above of an opened box.

Fig. 1 shows cross sections through a mouthpiece (10), a cigarette body (12) and an adapter (14) arranged next to each other.

The overall cylindrical mouthpiece (10) consists of known filter material, such as that used for the filter mouthpieces of conventional cigarettes. One end of the mouthpiece (10) is designed as a suction outlet (18). The end of the mouthpiece (10), which is turned away from the suction outlet (18), is designed with a hollow cylindrical recess. The surface (22) of the mouthpiece (10) and the left end pursuant to Fig. 1 is designed with closed cells.

The cigarette body (12) features a cylindrical jacket or body (24) of thermally insulating material, or a ceramic material, which contains a warming tube (26) made of highly thermally conductive material, e.g. copper. The left end of the warming tube (26) pursuant to Fig. 1 protrudes from the body (24), with the outer shape of the protruding region (28) approximately corresponding to the outline of the recess (20). The end of the protruding region (28) is open and preferably designed with passage outlets (30). It is also possible that the end is closed and then designed with at least one further passage outlet.

At its right end, the body (24) is designed with a recess (32) in which the right end of the warming tube (26) is exposed.

The right end of the body (24), together with the outlet of the warming tube (26), forms an air inlet, connected to an air inlet in the left end of the warming tube (26) via a passage outlet through the interior of the warming tube (26).

The cigarette body (12) and the mouthpiece (10) form, for example, a dummy with an appearance corresponding to that of a conventional filter cigarette.

The adapter (14), which, for example, is designed overall as a sheet metal element, presents a left side in the form of a sleeve (34), pursuant to Fig. 1, which forms an insertion inlet (36) for the insertion of the right end of the cigarette body (12) pursuant to Fig. 1. At a distance from the sleeve (34) the adapter (14) is designed with an insertion component (38), which e.g. presents two upward bending arms (40) (in Fig. 1, only one is visible), which are not joined to a complete sleeve, but are elastic and may be prised apart.

Between the sleeve (34) and the insertion component (38), a bimetallic sheet (42) is included, which at normal room temperature takes on the approximately axial position so represented and bends upwards on heating, so that it closes the sleeve (34).

A familiar cigarette lighter, suitable for a smoke-free cigarette corresponding to the invention, is sketched in Fig. 2 and indicated as (44). The cigarette lighter (44) presents a body (46) in which the fuel, e.g. LPG, is taken up. In an attachment (48) to the body (46), a burner nozzle is arranged, to which air is conducted via the air passage (50), so that after lighting the lighter by means of a handle (52) the peak of a flame in the form of the flame (54) shoots forward from the attachment (48). The function of the described components is as follows:

The mouthpiece (10) is coated on the internal side of the recess (20) with a volatile pleasure-giving stimulant (58), e.g. nicotine mixed with scents and/or flavourings.
In its condition on delivery, the mouthpiece (10) is e.g. surrounded by plastic foil, so that the pleasure-giving stimulant (58) cannot evaporate. After removing the plastic foil, the mouthpiece (10) is attached to the protruding area (28) of the cigarette body (12), so that a subassembly arises which has the appearance of a conventional cigarette (mouthpiece with cigarette body).

In order to "light up", the right end of the cigarette body (12) pursuant to Fig. 1 is inserted into the insertion inlet (36) of the adapter (14). The adapter (14), with its insertion component (38) is then slid back onto the attachment (48) of the cigarette lighter (44). It is evident that that the adapter (14) can then be slid back onto the cigarette lighter (44) and the cigarette can then be inserted into the insertion inlet (36).

The reciprocal insertion movements of the cigarette body (12) into the sleeve (34), as well as of the attachment (48) of the cigarette lighter to the insertion component (38) are advantageously limited through the rebates designed in the adapter (14), so that the geometrical relationship of the cigarette lighter to the cigarette body (12) and hence of the flame (54) to the warming tube (26) is well-defined, if the flame (54) has a predefined form. In this way, the deformation of the bimetallic sheet (42) is coordinated with the warming of the warming tube (26) and thus with the warming of the pleasure-giving stimulant (58) and the external side of the cigarette body (12), which is held in the hand, so that with the corresponding coordination of the heat conductivity of the cigarette body,
its outer surface is only slightly heated, even though the pleasure-giving stimulant (58) has certainly reached its release or evaporation temperature, e.g. between 50-60 °C.

With the handle (52), the lighter is then activated so that the flame (54) reaches the interior of the recess (32) and the left end region of the warming tube (26) is heated, so that the pleasure-giving stimulant (58) is evaporated or released. When the warming tube (26) is adequately heated, i.e. with adequate duration of the flame (54), the bimetallic sheet (42) is heated and unbends, so that a smoker who encloses the mouthpiece (10) with his/her lips can turn off the cigarette lighter (44) and remove it.

After withdrawing the adapter (14), the cigarette which consists of the mouthpiece (10) and the cigarette body (12) is available for enjoyment like a normal cigarette, since the pleasure-giving stimulant (58) is held at an adequate temperature for evaporation for a sufficiently long period by the warming tube (26) as a consequence of this high warming capacity. On drawing in air through the suction opening (18), this air flows through the warming tube (26) and its passage opening (30) along the surface region of the recess (20) which is coated or soaked with a pleasure-giving stimulant (58), so that the air takes up the evaporated and other volatile components of the pleasure-giving stimulant (58), which can be enjoyed in the mouth or by inhalation.

The sizing of the adapter (14) and the length of insertion of the cigarette lighter into the adapter, on the one hand, and of the cigarette in the adapter on the other, are such that the tip of the flame (54) is located concentrically to the warming tube (26),

at a short distance from its right-hand end, in accordance with Fig. 1. In order that the supply of air to the flame through the adapter is not disturbed, the insertion component (38) is designed in such a way that the air passage (50) essentially remains exposed. The flame (54) is essentially located in the area between the sleeve (34) and the insertion component (38).

The discovery may be modified in many ways. For example, the mouthpiece (10) need not contain filter material. The recess (20) may be designed as part of the cigarette body (12), so that the mouthpiece is designed with a corresponding protrusion. The body (24) and the warming tube (26) may be designed together in a single component, while the jacket is designed e.g. as a layered body consisting on the inside of a material with a high degree of thermal conductivity with the highest possible heating capacity, and on the outside, of a material with low thermal conductivity. Alternatively, the body (24) may be designed in the form of a thermal container with multiple layers and a vacuum between these layers.

The warming tube (26) may be designed in wholesale fashion as a heat conductor and heat reservoir with high heat capacity, from a material with good heat conducting properties, with the right end pursuant to Fig. 1 having the largest possible surface, e.g. through fluting. In this case, an air duct may at least be constructed via a groove in the "warming rod" and/or jacket, and conducts along the ribs in the recess (20) and/or the area of the warming rod which protrudes into the mouthpiece.

The adapter may also be constructed in a different way, e.g. adapted for the attachment of the cigarette body (12) to the cigarette lighter of a lorry. The adapter will then contain a heated component, which comes into direct contact with the warming tube (26) and through the insertion of the adapter into a cigarette lighter, is heated until the warming tube (26) or the recess (20) are heated sufficiently, e.g. to around 50-60 °C.

In the place of the depicted cigarette lighter, any other lighter may be used, where lighters with long flames are preferred.

As an accessory, a lighter specially adapted to the cigarette corresponding to the invention may be offered, which produces a predefined flame and is extinguished after a predefined interval.

Liquids or powder may be used as a pleasure-giving stimulant, with these introduced into the recess (20) or part of the mouthpiece coated with or soaked in these. According to the taste of consumers, different pleasure-giving stimulants may be used, e.g. nicotine enriched with flavours and scents, etc. Alternatively, the pleasure-giving stimulant may be contained in a pleasure-giving stimulant body, which is inserted into the recess as a tablet, but which lines the entire recess. It is evident that the pleasure-giving stimulant holder, available as a separate component, will be porous or designed with passage vents and located between the actual mouthpiece and the air outlets of the warming tube. In particular, on using such a pleasure-giving stimulant holder, the mouthpiece itself is reusable, in that it consists of a hygienic and easily cleanable material.

Fig. 3 presents a view from above of a box (60) in which the cigarette corresponding to the invention may be stored in the manner of conventional cigarette packaging. The reusable cigarette bodies (12) designed with different values may be stored in a case (62). A case (64) is provided for the inclusion of an adapter. Cases (66) are provided for the inclusion of mouthpieces (10) intended for single use, preferably in initially sealed form. In the represented example, 14 mouthpieces (10) can be accommodated. The mouthpieces (10) are bought in shops or vending machines and stored in the boxes (60). The represented box (60) thus corresponds to a conventional box with 14 conventional cigarettes.
The refilling of the box (60), which can be designed as a high-value box with a lid which is not depicted, is comparatively affordable, since only the mouthpieces (10) must be renewed.

In an amended form of execution, reusable mouthpieces (10) may be designed. The recess (20) will then be repeatedly coated with pleasure-giving stimulant, which is constituted in such a way that it may be consumed in a form which is entirely residue-free.

Reference sign list

10 Mouthpiece
12 Cigarette body
14 Adapter
16 Filter material
18 Suction outlet
20 Recess
22 Surface
24 Body
26 Warming tube
28 Region
30 Passage outlet
32 Recess
34 Sleeve
36 Insertion inlet
38 Insertion component
40 Arm
42 Bimetallic sheet
44 Cigarette lighter
46 Body
48 Attachment
50 Air passage
52 Handle
54 Flame
58 Pleasure-giving stimulant
60 Box
62 Case
64 Case
66 Case

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Patent claims

1. Cigarette body for a smoke-free cigarette, the cigarette body (12) of which has a cylindrical body (24) with an air inlet at one end and an air outlet at the other end, an air channel linking the air inlet with the air outlet and a heating device (26) to warm the air passing through the channel, with the end designed with an air outlet attachable to the end of a cylindrical mouthpiece (10) containing a deposit for a pleasure-giving stimulant (58) and designed with a suction opening (18), so that following the application of negative pressure to the suction opening, the pleasure-giving stimulant is evaporated by the warmed air flowing through the channel and exits together with the air via the suction opening, with this characterised by the fact that the body (24) is traversed axially by a heat conductor (26) made out of thermally conductive material, which is accessible via the axial end of the body through the air inlet and at the other axial end, there is a device which transfers heat to the pleasure-giving stimulant (58) and characterised by the fact that the body has a structure such that the surface facing radially outwards is thermally insulated from the heat conductor (26).

2. Cigarette body characterised pursuant to Claim 1 by the fact that the body (24) contains thermal insulating material.

3. Cigarette body pursuant to Claim 1 or Claim 2, characterised by the fact that the heat conductor consists of a warming tube (26), the inside of which forms the air exchange channel.

4. Cigarette body pursuant to Claims 1 to 3, characterised by the fact that an end region (28) of the warming tube (26) containing the air outlet protrudes from the body (12) and may be applied to a recess (20) of the mouthpiece (10) containing a deposit for the pleasure-giving stimulant (58).

5. Cigarette body pursuant to Claim 4, characterised by the fact that the end of the warming tube (26) protruding from the body (12) is designed with openings (30) on its lateral surface.

6. Cigarette containing a mouthpiece (10) and a cigarette body (12) pursuant to one of the Claims 1 to 5.

7. Mouthpiece for a cigarette pursuant to Claim 6, characterised by the fact that the mouthpiece (10) contains filter material (16), in which the condensing steam from the pleasure-giving stimulant and the solids contained in the vapour are deposited.

8. Mouthpiece pursuant to Claim 7, characterised by the fact that one of the ends of the mouthpiece (10) facing away from the outlet (18) is designed with a recess (20) for the insertion of the end region of the warming tube (26).

9. Mouthpiece pursuant to Claim 8, characterised by the fact that at least a part of the inner wall of the recess is provided with a pleasure-giving stimulant (58).

10. Mouthpiece pursuant to Claim 7 or 8, characterised by the fact that the pleasure-giving stimulant is contained in a pleasure-giving stimulant holder arranged between the warming tube (26) and the mouthpiece (10).

11. Adapter for attachment to the end of the cigarette body designed with an air inlet, pursuant to one of Claims 1 to 5 for a cigarette (10, 12), pursuant to one of Claims 6 to 10 to a heating source (44) characterised by an insertion outlet (36), for the insertion of the end region of the cigarette body (12) designed with an air inlet and an insert component (38) for the attachment of the adapter (14) to the heat source (44), in such a way that the heat conductor (26) may be heated by the heat source (44).

12. Adapter, pursuant to Claim 11, characterised by the fact that the insertion component (38) is suitable for attachment to a cigarette lighter (44), so that the end region of the heat conductor (26) facing it may be heated by a flame from a cigarette lighter.

13. Adapter, pursuant to Claim 11 or 12, characterised by a switching device (42) which terminates the conduction of heat via the warming tube (26) after predefined warming.

14. Cigarette box, characterised by the fact that the cigarette box for the accommodation of several mouthpieces (10) and at least one cigarette body (12) is applicable pursuant to one of the Claims 1 to 5.

15. Cigarette box, pursuant to Claim 14, characterised by the fact that the cigarette box for the accommodation of an adapter (14) is applicable pursuant to one of the Claims 8 to 10.