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ROOM AIR PURIFIER

The present invention relates to a room air purifier according to the preamble of claim 1.

Known from the prior art are room air purifiers which have at least one ozone generator arranged in a housing with an air inlet opening and an air outlet opening. Here, a fan is provided which is arranged at the air inlet opening and sucks air into the interior of the housing. The air passes through the ozone generator, wherein the ozone combines with odor molecules in the air and eliminates odors, germs, viruses and bacteria. The air purified in the device is then fed back to the room.

Furthermore, room air purifiers are known that are designed in such a manner that ozone is generated by an ozone generator and blown out of the device into the room by means of the fan arranged at the air inlet opening.

From US 2005/069465 A1, a room air purifier with an ozone generator is known, wherein the air is ejected substantially perpendicular to the longitudinal axis of the room air purifier through air outlet openings. This publication discloses a room air purifier according to the preamble of claim 1.

In prior art devices that introduce ozone into a room to neutralize odors, concentrations that exceed predetermined thresholds for ozone concentration occur at the air outlet opening. Currently permitted is 50 ppb at a distance of 50 mm from the air outlet opening.

The underlying object of the present invention is to provide a room air purifier with an ozone generator, by the use of which ozone is introduced into the room in order to purify

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the air in the room while not exceeding the predetermined threshold values for the ozone concentration.

This object is achieved by the features of patent claim 1. Further configurations according to the invention and advantages are apparent from the subclaims.

Accordingly, a room air purifier is proposed which comprises a housing in which an ozone generator, preferably an ozone generator for the formation of ozone by means of UV radiation, is arranged along a longitudinal axis of the housing or axially parallel thereto, wherein the ozone generator, viewed radially, is surrounded by an air guiding component at a predetermined distance within a predetermined angular range.

Here, at least the side of the air guiding component facing the ozone generator is designed to be reflective for the radiation emitted by the ozone generator. Furthermore, viewed axially, an air circulation unit is arranged at one end of the housing, which is suitable to cause a laminar flow from the axially opposite end of the housing, which has an air inlet opening, through the housing and towards the air circulation unit.

According to the invention, after the air circulation unit, viewed axially in the direction of flow, an air outlet opening is provided via which ozone-enriched air passing therethrough and sucked into the interior of the device is ejected, wherein the air outlet opening is designed in such a manner that the ozone-enriched air is uniformly ejected into the room in a uniformly concentrated manner at all angles within an angular range between 0 and 90° relative to the longitudinal axis of the housing.

Due to the fact that at least the side of the air guiding component facing the ozone generator is designed to be

reflective, it is ensured that disinfection of the air also takes place inside the device. Furthermore, the arrangement of the air circulation unit at the air outlet opening achieves a substantially laminar air flow, thereby ensuring that the air is uniformly mixed with ozone so that hotspots, namely high local ozone concentrations at the air outlet opening caused by turbulence in the air, are avoided.

The end face of the cylindrical housing, to which end face the air outlet opening is assigned, has a smaller diameter than the housing and, viewed axially, is arranged offset outwardly by a predetermined amount.

Due to the design according to the invention of the air outlet opening, the air is ejected in a uniformly concentrated manner without exceeding the predetermined threshold values with respect to the ozone concentration. The air outlet opening is dimensioned in such a manner that the UV generator is not directly visible from the outside and that the largest possible cross-section is provided.

Furthermore, with the configuration according to the invention of the air outlet opening, it is avoided that the ozone-enriched air is introduced into the room along only one direction, which would increase the ozone concentration in a disadvantageous manner. Due to the configuration of the air outlet opening, the air is preferably ejected quarter-spherically.

Also, unwanted turbulence of the air inside the device is additionally avoided by providing an air deflection component according to a refinement of the invention. At the end of the air guiding component facing the air circulation unit, on the radially open region of the air guiding component, an air deflection component is arranged, viewed axially, over a predetermined length. Furthermore, the air deflection component is preferably arranged inclined with

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respect to the longitudinal axis in such a manner that flowing air is supplied to the air circulation unit via the air guiding component. Accordingly, at its end facing the air circulation unit, the ozone generator is completely surrounded, radially viewed, by the air deflection component and the air guiding component.

The invention will be explained in more detail below by way of example with reference to the attached figure, which is a schematic perspective illustration of a room air purifier according to the invention without the housing.

In the attached figure, a room air purifier designed according to an advantageous configuration of the invention is denoted by 1, wherein the housing, which in this case is of cylindrical design, is not shown.

In the example shown, the room air purifier 1 has an ozone generator 2 designed as a UV-C fluorescent tube which is arranged along a longitudinal axis 9 of the housing of the room air purifier and, viewed radially, is surrounded by an air guiding component 3 at a predetermined distance which can vary, viewed axially and radially, in a predetermined angular range. As illustrated with reference to the figure, the ozone generator 2 can be designed as a UV-C fluorescent tube, as a series connection of a plurality of UV LEDs or as a single UV LED; furthermore, the output of the ozone generator 2 used is preferably adjustable.

In the example shown, the air guiding component 3 is designed as a U-shaped profile, the edges of which run parallel to the longitudinal axis of the room air purifier 1, wherein the end of the air guiding component 3 facing the air circulation unit 4 is designed in such a manner that an air deflection component 8 can be arranged on this end. The air guiding component 3 and the air deflection component 8 can also be designed as a single piece. In the context of further

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embodiments, the air guiding component 3 can have a different shape; for example, the air guiding component 3 can be designed as a cylinder segment with open ends.

As already described, the room air purifier 1 according to the invention comprises an air circulation unit 4 which, in the example shown, is designed as an axial fan and is arranged at one end of the housing, wherein this arrangement of the air circulation unit 4 advantageously causes a substantially laminar flow from the axially opposite end of the housing, which comprises an air inlet opening 5, through the housing and towards the air circulation unit 4.

As can be seen from the figure, viewed axially in the direction of flow, an air outlet opening 6 is provided after the air circulation unit 4 on the end face of the housing via which ozone-enriched air passing therethrough and sucked into the interior of the device via the opposite air inlet opening 5 is ejected.

According to the invention, the air outlet opening 6 is designed in such a manner that the ozone-enriched air is ejected in a uniformly concentrated manner in an angular range between 0 and 90° with respect to the longitudinal axis 9, as illustrated by the arrows.

In the example shown, this is achieved in that the end face of the housing, to which the air outlet opening 6 is assigned, has a smaller diameter than the housing and, viewed axially, is arranged displaced outwardly by a predetermined dimension. The predetermined dimension as well as the difference in the diameters of the end face of the housing and the housing are selected in such a manner that the ozone generator cannot be seen from the outside. Without the axial displacement of the end face of the housing, an annular gap would be formed between the end face of the housing and the outer surface of the cylindrical housing.

In the attached figure, a plate denoted by 7 is illustrated to which the ozone generator 2, the air guiding component 3, the air circulation unit 4 and other components, such as the electronics required for operating the room air purifier, are attached.

The conception according to the invention creates a room air purifier 1 in which the ozone concentration in the room in front of the air outlet opening 6 does not exceed predetermined threshold values.

In contrast to the prior art, according to which ozone air purifiers purify air inside the devices by a high ozone concentration and eject fresh air at the end, ozone is introduced according to the invention into the room in the respective permitted concentration, so that the air in the room itself is purified. By means of the invention, the total amount of ozone necessary to purify the air of a room is ejected, but without exceeding the values of ozone concentration applicable according to the respective standard.

P a t e n t k r a v

1. Rumluftrensers (1), omfattende et hus, i hvilket der langs med en langsgående akse af huset eller akseparallelt med dette er anbragt en ozongenerator (2), hvor ozongeneratoren (2) radialt betragtet er omgivet af en luftføringskomponent (3) med en på forhånd angivet afstand i et på forhånd angivet vinkelområde, hvor i det mindste den side af luftføringskomponenten (3), der vender mod ozongeneratoren (2), er udført, så den er reflekterende for den stråling, der udsendes fra ozongeneratoren (2), hvor der aksialt betragtet ved en ende af huset er anbragt en luftcirkulationsenhed (4), som er egnet til at bevirke en laminar strømning fra den aksialt betragtet overfor liggende ende af huset, som har en luftindgangsåbning (5), gennem huset i retning mod luftcirkulationsenheden (4), hvor der aksialt betragtet i strømningsretningen mod luftcirkulationsenheden (4) er tilvejebragt en luftudgangsåbning (6), via hvilken gennemstrømmende luft, der suges ind i indretningens indre og er beriget med ozon, udstødes, **kendetegnet ved, at** luftudgangsåbningen (6) er udformet på en sådan måde, at luften, der er beriget med ozon, udstødes ind i rummet på en ensartet og koncentreret måde i et vinkelområde mellem 0 og 90° i forhold til den langsgående akse, hvor huset er udført cylinderformet og luftudgangsåbningen (6) realiseres ved, at endeflader af huset, som luftudgangsåbningen (6) er tilknyttet, har en mindre diameter end huset og aksialt betragtet er anbragt forskudt udad med et på forhånd angivet stykke.

2. Rumluftrensers (1) ifølge krav 1, **kendetegnet ved, at** der ved den ende af luftføringskomponenten (3), der vender mod luftcirkulationsenheden (4), på det radialt betragtet åbne område af luftføringskomponenten (3) aksialt betragtet over en på forhånd angivet længde er anbragt en luftafledningskomponent (8), som i forhold til den langsgående akse er anbragt hældende på en sådan måde, at der tilføres strømmende luft til luftcirkulationsenheden via luftføringskomponenten (4).

3. Rumluftrensers (1) ifølge krav 2, **kendetegnet ved, at** luftføringskomponenten (3) er udført som et U-formet profil, hvis kanter forløber parallelt med rumluftrensersens (1) langsgående akse, hvor den ende af luftføringskomponenten

(3), der vender mod luftcirkulationsenheden (4), er udført således, at luftafledningskomponenten (8) kan anbringes på det radialt betragtet åbne område af luftføringskomponenten (3) ved denne ende.

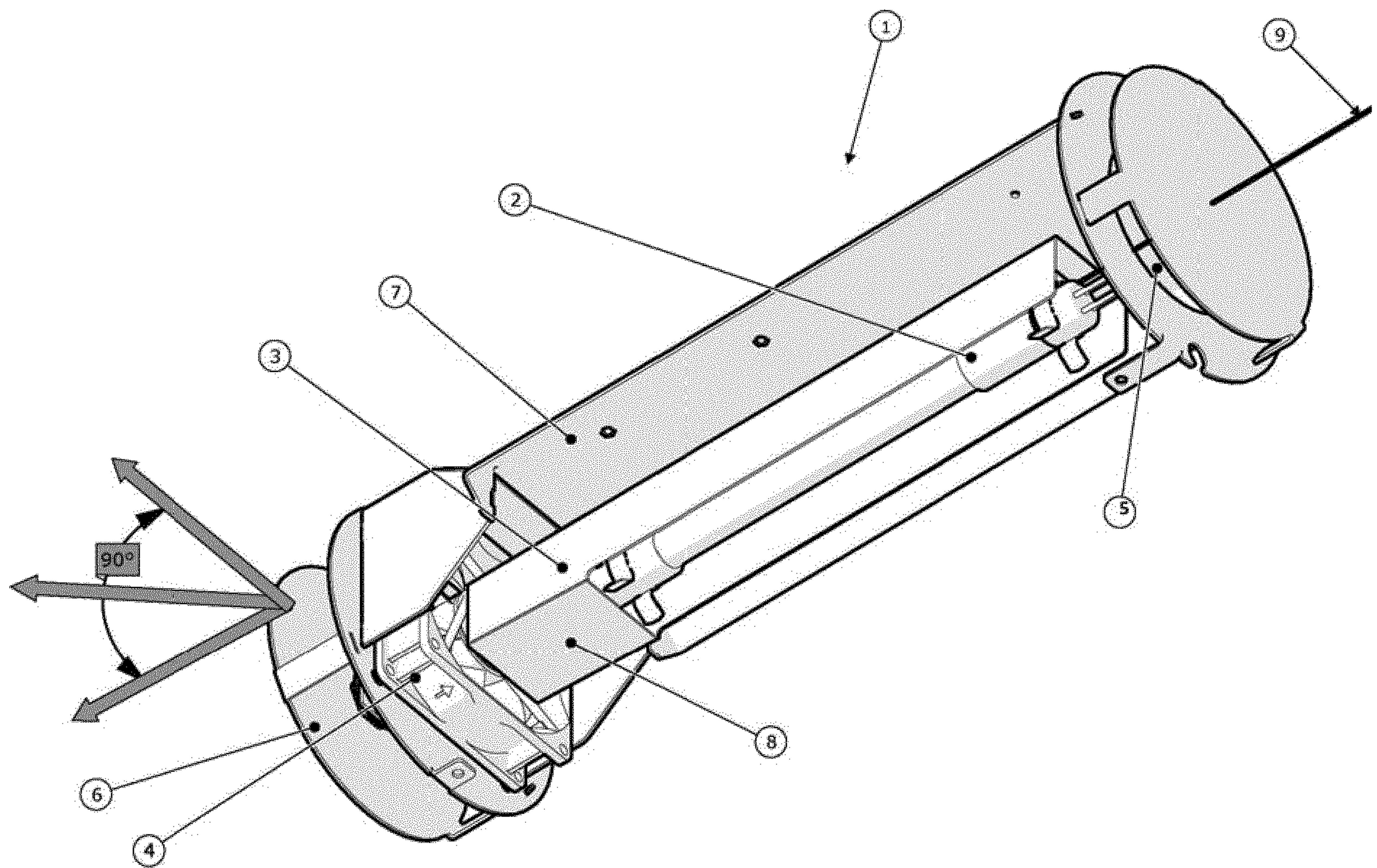
5 **4.** Rumluftreenser (1) ifølge krav 2 eller 3, **kendetegnet ved, at** luftføringskomponenten (3) og luftafledningskomponenten (8) er udført i ud i et.

10 **5.** Rumluftreenser (1) ifølge et af de foregående krav, **kendetegnet ved, at** ozongeneratoren (2) er udført som ozongenerator til dannelse af ozon ved hjælp af UV-stråling.

6. Rumluftreenser (1) ifølge krav 5, **kendetegnet ved, at** ozongeneratoren er udført som et UV-C-lysrør eller i det mindste har en UV-LED.

15 **7.** Rumluftreenser (1) ifølge et af de foregående krav, **kendetegnet ved, at** luftcirkulationsenheden (4) er udført som en aksialventilator.

8. Rumluftreenser (1) ifølge et af de foregående krav, **kendetegnet ved, at** ozongeneratorens (2) effekt kan indstilles.



Figure