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(54) An air purifier of the regenerating type.

(57) An air purifier comprising a mercury lamp (1) emitting electrons and generating ozone during the purification. The air purifier is surrounded by a non-conductive casing (2) absorbing molecules negatively charged due to the emitted electrons. As a result the ozone molecules become positively charged and may therefore recombine with negatively charged ozone molecules to produce neutral oxygen molecules, cf. Figure 1.

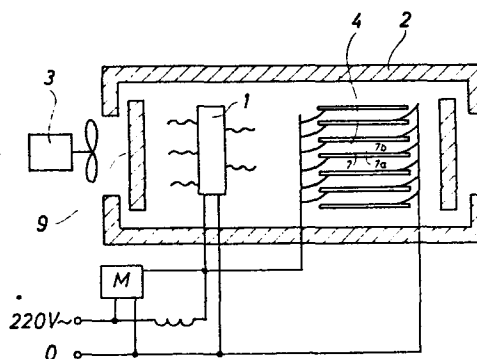


Fig.1

EP 0 000 738 A1

- 1 -

An air purifier of the regenerating type.

The invention relates to an air purifier of the regenerating type, which comprises a radiating means such as a mercury lamp, and in which the air flows through an electric field in an electron-cloud forming member.

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An air purifier comprising a mercury vapour lamp is known from, for example, British patent specification No. 1,400,519. The irradiation with ultraviolet rays changes the nature of the passing pollutant.

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It is also known to treat and purify air by passing the air through an electrostatic field. As a result ozone is, however, produced, cf. e.g. the German Offenlegungsschrift Nos. 2,452,824 and 2,205,885. O_3 can be reduced to O_2 by oxidizing a metallic material, cf. the above-mentioned British

15 patent specification. This filter method is, however, not particularly efficient. Furthermore, the filter material must be replaced from time to time.

20 The invention as claimed is intended to provide an air purifier which is able to sterilize air and neutralize the ozone molecules in a more efficient manner.

The air purifier according to the invention is characterised
25 by the radiating means being surrounded by a charge absorbing, non-conductive casing.

As a result the ozone molecules become positively charged, whereby a reaction with negatively charged ozone molecules and consequently a neutralisation is facilitated.

5. According to a preferred embodiment of the invention the non-conductive casing is made of a soft, optionally plumbiferous plastic.

One method of carrying out the invention is described in detail below with reference to drawings, which illustrate only one specific embodiment, in which

Fig. 1 illustrates the air purifier according to the invention, and

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Fig. 2 illustrates a voltage multiplier forming part of the air purifier.

The air purifier according to the invention operates in accordance with the regeneration principle. It comprises a radiating means 1 such as a mercury lamp, emitting both electrons and X-rays. By applying a voltage of 220 VAC, the X-ray wave length is in the range of 300-400 nm. By applying a voltage of 8000 V, the wave length range is increased to about 165 nm. At a wave length of 210 nm a destruction of DNA molecules and consequently a destruction of germs and viruses takes place. At a wave length of 250 nm a cell division takes place so quickly that the cells produced cannot survive. By the electron bombardment the oxygen, hydrogen and nitrogen bound to heavy molecules such as sulphur, chlorine or metals, are liberated. The heavy molecules are detected and captured by the chamber material, while the liberated oxygen molecules produce ozone molecules. These ozone molecules are, however, positively charged due to the fact that the heavy particles detected and captured by the chamber material are negatively charged (the chamber material must be non-conductive). An electron-cloud forming member, preferably a capacitor-like member 4, is placed behind the radiating means 1, said member generating negatively charged O_3

molecules. When a positively charged O_3 molecule meets a negatively charged O_3 molecule, the oppositely charged molecules recombine to produce O_2 molecules.

- 5 The tension across the capacitor-like member 4 is for instance of the magnitude 8000 V, which corresponds substantially to the voltage necessary for the radiating means 1 to emit X-rays having wave lengths down to 165 nm.
- 10 Fig. 2 shows a voltage multiplier M comprising a sufficient number of capacitors C mutually connected through rectifier diodes in such a manner that the charge can only be transmitted in one direction. Fig. 2 only shows 10 capacitors.

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- The capacitor-like member 4 is composed of circuit carts 7 having metal coatings 7a and 7b on both sides. The surfaces of these coatings are suited for emission of electrons. The number of plates 7 may be varied. The surface area of each
- 20 plate is $10 \times 10 \text{ cm}^2$. The mutual distance between the plates is for instance 1 cm. The casing 2 surrounding the radiating means 1 and the capacitor-like member 4 is composed of a soft, optionally plumbiferous plastic. A separate plumbiferous coating may also be provided on the outside of the
- 25 casing 2. A blower 3 is situated at an inlet opening 9 constructed in such a manner that radiation direct to the surroundings is impossible.

- An air purifier with a power consumption of 80 W can treat
- 30 60 m^3 air per hour.

A choke coil is inserted between the output of the voltage multiplier M and the phase terminal.

- 35 The power supplied at the high voltage is relatively low. Furthermore, a DC-discharge from the multiplier only occurs at every other half wave of the voltage of the mains.

The air purifier according to the invention is inexpensive

to produce. The most expensive component is the casing.

By using the air purifier according to the invention the oxygen content in a room is increased no more than 6-8%.

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The air purifier, which may be varied in many ways without deviating from the scope of the invention, is mainly intended for aircrafts, automobiles or hospitals. The purifier may, however, also be used industrially or in offices. When used
10 industrially, the air purifier improves the air for the employees. It is easy to mount, since it does not require ventilating ducts to the surroundings. Furthermore, no thermal loss occurs. In slaughterhouses it increases the keeping quality of the meat since only viruses and bacteria are killed.

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Claims:

1. An air purifier of the regenerating type, which comprises a radiating means such as a mercury lamp (1), and in which the air flows through an electric field in an electron-cloud forming member (4), characterised by
5 the radiating means (1) being surrounded by a charge absorbing, non-conductive casing (2).
2. An air purifier as claimed in claim 1, characterised by the non-conductive casing (2) being of a soft, optionally
10 plumbiferous plastic.
3. An air purifier as claimed in claim 1 or 2, characterised in that both the radiating means (1) and the electron-cloud forming member (4) are actuated by a voltage multiplier con-
15 nected to the mains.
4. An air purifier as claimed in claims 1 - 3, characterised by the electron-cloud forming member (4) being a capacitor-like member.

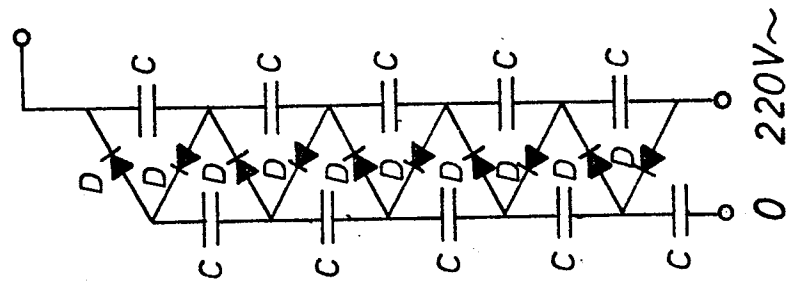


Fig.2

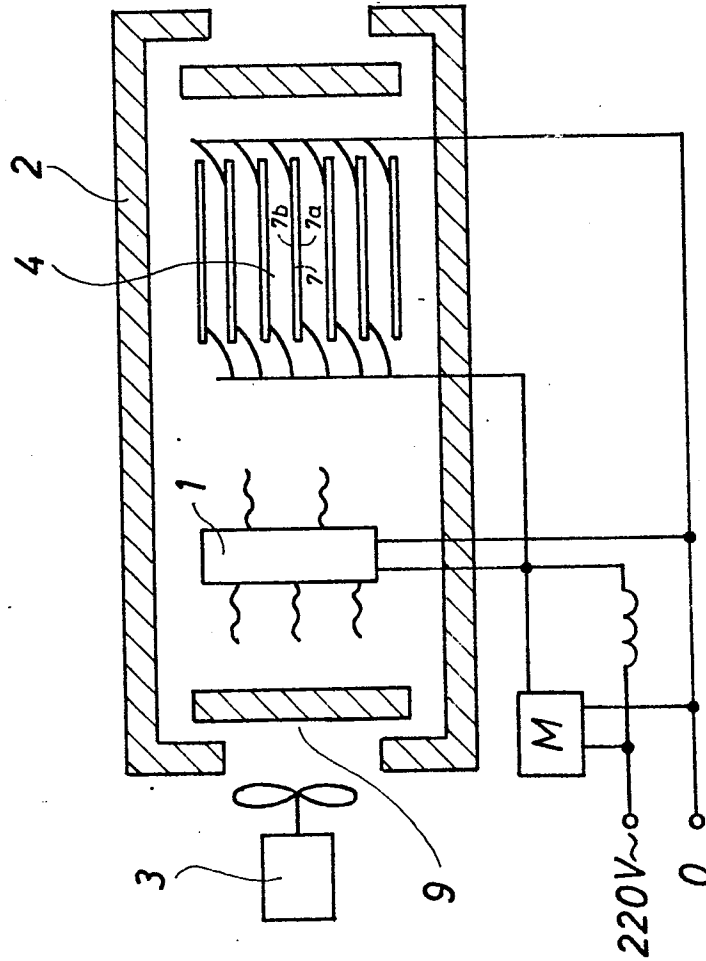


Fig.1



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EUROPEAN SEARCH REPORT

Application number
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DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
A	<u>FR - A - 2 240 021</u> (J.ROCHE) * Page 3, claim 1; figure 1 *	1	A 61 L 9/00
A	<u>FR - A - 2 227 017</u> (R.E.GOUTTEBESSIS) * Page 1, lines 12 tot 36 *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.)
			A 61 L 9/00
			CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
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<input checked="" type="checkbox"/> The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
The Hague	08-09-1978	DET/PRE	