Abstract: A nasal cavity filter (2) having a substantially cylindrical supporting wall (4), which adheres to the walls of a nasal cavity, and an inner surface (5) of which defines a cavity (6) for the passage of air inhaled and exhaled by the user. The cavity (6) houses a number of fins (7), which generate turbulence in the air flowing through, and the surface of which impacted by the air retains particles present in the air.
NASAL CAVITY FILTER

TECHNICAL FIELD

The present invention relates to a nasal cavity filter.

More specifically, the filter according to the present invention is disposable, and provides mainly for protecting the respiratory tracts from atmospheric pollution.

BACKGROUND ART

As is known, concern has repeatedly been expressed regarding the harmful effects of air pollution, of which concentrations of sulphur dioxide and fine powder in industry and transport, and pollution by carbon monoxide, ozone, and benzene are among the major threats to human health.

Scientific research leaves no doubt as to the close relationship between the concentration of these pollutants in air and the occurrence of respiratory diseases.

At present, the market offers no comfortable, easy-to-use products designed to combat or at least partly solve the problem.
DISCLOSURES OF INVENTION

It is an object of the present invention to provide a device designed to prevent inhalation of harmful particles present in air.

According to the present invention, there is provided a nasal cavity filter as claimed in the accompanying Claims.

BRIEF DESCRIPTION OF THE DRAWINGS

A non-limiting embodiment of the invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a view in perspective of a preferred embodiment of a device comprising two filters in accordance with the present invention;

Figure 2 shows a further view in perspective of the Figure 1 device.

BEST MODE FOR CARRYING OUT THE INVENTION

Number 1 in Figures 1 and 2 indicates as a whole a nasal cavity filter device comprising two filters 2 in accordance with the present invention; and a connecting member 3 positioned, in use, in front of the nasal septum. Each filter 2 is housed, in use, inside a respective nostril, and connecting member 3 serves to prevent overly forceful insertion of filters 2 inside the nostrils, and easy withdrawal of filters 2 from the nostrils.

Each filter 2 comprises a supporting wall 4, which is truncated-cone-shaped to adapt to the nasal cavity,
and an inner surface 5 of which defines a through cavity 6, through which the air inhaled and exhaled by the user flows in use.

Each filter 2 comprises a number of fins 7 extending from inner surface 5 of supporting wall 4 and housed longitudinally inside cavity 6. More specifically, each filter 2 comprises a first group of four fins 7a joined in the form of a cross and located close to a large-diameter opening 6a of cavity 6; and a second group of four fins 7b, which are separate and converge with one another, are offset 45° with respect to the group of fins 7a, and are located close to a small-diameter opening 6b of cavity 6. A shoulder 8 is formed on inner surface 5, between the first group of fins 7a and the second group of fins 7b, and facing the large-diameter opening ᾱa.

A number of surfaces are thus formed inside cavity 6, which generate turbulence in the inhaled airflow and, hence, an extensive impact area of the inhaled air on the surfaces.

Fins 7 are preferably molded from polymer material in one piece with supporting wall 4.

Supporting wall 4 and fins 7 are made of soft material, such as latex, alimentary silicone or medical silicone, and are optionally covered with outer material, such as paper, rubber-coated paper, silk, cotton, sponge, teased silk, or hypoallergenic plastic. Supporting wall 4 is of soft consistency to adhere perfectly to the nasal cavity and so ensure perfect sealing and firm seating,
unaffected by inhalation and exhalation, inside the nasal cavity.

Supporting wall 4 is designed to adapt to the nasal pyramid with no impairment in operation of the sebaceous glands, or in respiratory, olfactory or phonatory functions.

All the surfaces inside cavity 6 are preferably coated with water-base gel. In a further preferred embodiment, the gel is charged electrostatically, so that particles in the inhaled air are retained by viscosity as well as electrostatically.

The water-base gel may comprise one or more excipients from the group comprising: thymol, essential oils of various woods, essential oil of myristica, white Vaseline, lanolin, hydrogenated fatty acid triglycerides, glycerine, polyethylene glycols, and starch; and one or more active principles from the group comprising: camphor, essential oil of turpentine, menthol, essential oil of eucalyptus, kaolin, and bentonite.

In one particular embodiment, the filter according to the present invention may comprise a transverse filter comprising absorbent materials, such as active carbon, to more effectively retain gas-carried aerosol substances.

As will be clear from the above description, the device according to the present invention is highly straightforward and reliable, by combining the formation of turbulence in the inhaled air with an extensive impact area of the inhaled air on the particle retaining
surfaces.

The electrostatic gel, in particular, provides for effective particle retention by combining the electrostatic effect and viscosity of the gel.

Clearly, the materials and designs, particularly of fins 7, may differ from those described, provided they ensure turbulent airflow through cavity 6 and particle retention performance in accordance with the present invention.

It should be pointed out that, in addition to pollution protection, the filter according to the present invention may also be used for medical and surgical purposes, by also employing homeopathic and/or allopathic substances.
CLAIMS

1) A nasal cavity filter (2) comprising a substantially cylindrical supporting wall (4), which adheres to the walls of a nasal cavity, and an inner surface (5) of which defines a cavity (6) for the passage of air inhaled and exhaled by the user; said filter (2) being characterized by comprising a number of fins (7), which are housed inside said cavity (6), generate turbulence in the air flowing through, and the surface of which impacted by the air retains particles present in the air.

2) A nasal cavity filter (2) as claimed in Claim 1, characterized in that said fins (7) extend from said inner surface (5) of said supporting wall (4), and are positioned longitudinally with respect to the supporting wall (4).

3) A nasal cavity filter (2) as claimed in Claim 2, characterized in that said fins (7) are formed in one piece with said supporting wall (4).

4) A nasal cavity filter (2) as claimed in any one of the foregoing Claims, characterized by comprising a layer of gel covering said inner surface (5) and said fins (7).

5) A nasal cavity filter (2) as claimed in Claim 4, characterized in that said gel is water-based and charged electrostatically.

6) A nasal cavity filter (2) as claimed in Claim 4
or 5, characterized in that said gel comprises one or more excipients from the group comprising: thymol, essential oils of various woods, essential oil of myristica, white Vaseline, lanolin, hydrogenated fatty acid triglycerides, glycerine, polyethylene glycols, and starch; and one or more active principles from the group comprising: camphor, essential oil of turpentine, menthol, essential oil of eucalyptus, kaolin, and bentonite.

7) A nasal cavity filter (2) as claimed in any one of the foregoing Claims, characterized in that said supporting wall is made of a material from the group comprising latex, alimentary silicone, and medical silicone.

8) A nasal cavity filter (2) as claimed in Claim 7, characterized in that said supporting wall (4) and said fins (7) are covered with an outer material from the group comprising, paper, rubber-coated paper, silk, cotton, sponge, teased silk, and hypoallergenic plastic.

9) A nasal cavity filter (2) as claimed in any one of the foregoing Claims, characterized in that said supporting wall (4) is truncated-cone-shaped.

10) A nasal cavity filter (2) as claimed in Claim 9, characterized by comprising a first group of four fins (7a) joined in the form of a cross and located close to a large-diameter opening (6a) of the cavity (6); and a second group of four fins (7b), which are separate and converge with one another, are offset 45° with respect to
the first group of fins (7a), and are located close to a small-diameter opening (6b) of the cavity (6).

11) A nasal cavity filter (2) as claimed in Claim 10, characterized in that a shoulder (8) is formed on the inner surface (5), is located between the first group of fins (7a) and the second group of fins (7b), and faces the large-diameter opening (6a).

12) A nasal cavity filter device (1), characterized by comprising two nasal cavity filters (2) as claimed in one of the foregoing Claims, and a connecting member (3) extending between the two filters (2).
AMENDED CLAIMS

received by the International Bureau on 21 AUGUST 2008 (21.08.2008)

1. A nasal cavity filter (2) comprising a substantially cylindrical supporting wall (4), which adheres to the walls of a nasal cavity, and an inner surface (5) of which defines a cavity (6) for the passage of air inhaled and exhaled by the user; said filter (2) comprising a number of fins (7), which are housed inside said cavity (6), generating turbulence in the air flowing through, and and the surface of which impacted by the air retains particles present in the air said filter (2) being characterised in that it comprises a layer of gel covering said inner surface (5) and said fins (7).

2. A nasal cavity filter (2) as claimed in claim 1, characterised in that said gel is water-based and charged electrostatically.

3. A nasal cavity filter (2) as claimed in claim 1 or 2, characterised in that said gel comprises one or more excipients from the group comprising: thymol, essential oils of the various woods, essential oils myristica, white Vaseline, lanolin, hydrogenated fatty acid triglycerides, glycerine, polyethylene glycols, and starch; and one or more active principles from the group comprising: camphor, essential oil of turpentine, menthol, essential oil of eucalyptus, kaolin, and bentonite.

4. A nasal cavity filter (2) as claimed in claim 1, characterised in that said fins (7) extends from said inner surface 8%9 of said supporting wall (4), and are positioned longitudinally with respect to the supporting wall (4).

5. A nasal cavity filter (2) as claimed in claim 4, characterised in that said fins (7) are formed in one piece with said supporting wall (4).

6. A nasal cavity filter (2) as claimed in any one of the foregoing claims, characterized in that said supporting wall is made of a material from the group comprising latex, alimentary silicone, and medical silicone.

7. A nasal cavity filter (2) as claimed in claim 6, characterized in that said supporting wall (4) and said fins (7) are covered with an outer
material from the group comprising, paper, rubber-coated paper, silk, cotton, sponge, teased silk, and hypoallergenic plastic,

8. A nasal cavity filter (2) as claimed in any one of the foregoing claims, characterized in that said supporting wall (4) is truncated-cone-shaped.

9. A nasal cavity filter (2) as claimed in claim 8, characterized by comprising a first group of four fins 87a) joined in the form of a cross and located close to a large-diameter opening (6a) of the cavity (6); and a second group of four fins (7b), which are separated and converged with one another, are offset 45° with respect to the first group of fins (7a), and are located close to a small-diameter opening (6b) on the cavity (6).

10. A nasal cavity filter (2) as claimed in claim 9, characterized in that a shoulder (8) is formed on the inner surface (5), is located between the first group of fins (7a) and the second group of fins (7b), and faces the large-diameter opening (6a).

11. A nasal cavity filter device (1), characterized by comprising two nasal filters (2) as claimed in one of the foregoing claims, and a connecting member (3) extending between the two filters (2).
STATEMENT UNDER ARTICLE 19<1>

The following statement refers to the International Search Report and the Written Opinion of the International Searching Authority established with respect to the International Application No. PCT/IT2007/00036, in the name of NARCISO Paolo

Examiner in the Written Opinion of the International Searching Authority states that claim 1 is not new in view of US-A-5,787,884, and that dependent claims 2-12 do not contain any inventive features.

However, we respectfully draw the attention of the Examiner on the fact that features claimed in claims 4 and 5 of the subject International Application are neither known nor obvious from Documents D1-D4.

Provision of a gel layer on the inner surface permits to obtain an improved effect in blocking particles.

New proposed claims are:

“L A nasal cavity filter (2) comprising a substantially cylindrical supporting wall (4), which adheres to the walls of a nasal cavity, and an inner surface (5) of which defines a cavity (6) for the passage of air inhaled and exhaled by the user; said filter (2) comprising a number of fins (7), which are housed inside said cavity (6), generating turbulence in the air flowing through, and the surface of which impacted by the air retains particles present in the air said filter (2) being characterised in that it comprises a layer of gel covering said inner surface (5) and said fins (7).

2. A nasal cavity filter (2) as claimed in claim 1, characterised in that said gel is water-based and charged electrostatically,

3. A nasal cavity filter (2) as claimed in claim 1 or 2, characterised in that said gel comprises one or more excipients from the group comprising: thymol, essential oils of the various woods, essential oils myristica, white Vaseline, lanolin, hydrogenated fatty acid triglycerides, glycerine, polyethylene glycols, and starch; and one or more active principles from the group comprising: camphor, essential oil of turpentine, menthol, essential oil of eucalyptus, kaolin, and bentonite.

4. A nasal cavity filter (2) as claimed in claim 1, characterised in that said fins (7) extends from said inner surface 8%9 of said supporting wall (4), and are positioned longitudinally with respect to the supporting wall (4).

5. A nasal cavity filter (2) as claimed in claim 4, characterised in that said fins (7) are formed in one piece with said supporting wall (4).

6. A nasal cavity filter (2) as claimed to any one of the foregoing claims, characterized in that said supporting wall is made of a material from the group comprising latex, alimentary silicone, and medical silicone.

7. A nasal cavity filter (2) as claimed in claim 6, characterized in that said supporting wall (4) and said fins (7) are covered with an outer material from the group comprising, paper, rubber-coated paper, silk, cotton, sponge, teased silk, and hypoallergenic plastic.
8. A nasal cavity filter (2) as claimed in any one of the foregoing claims, characterized in that said supporting wall (4) is truncated-cone-shaped.

9. A nasal cavity filter (2) as claimed in claim 8, characterized by comprising a first group of four fins 87a) joined in the form of a cross and located close to a large-diameter opening (6a) of the cavity (6); and a second group of four fins (7b), which are separated and converged with one another, are offset 45° with respect to the first group of fins (7a), and are located close to a small-diameter opening (6b) on the cavity (6).

10. A nasal cavity filter (2) as claimed in claim 9, characterized in that a shoulder (8) is formed on the inner surface (5), is located between the first group of fins (7a) and the second group of fins (7b), and faces the large-diameter opening (6a).

11. A nasal cavity filter device (1), characterized by comprising two nasal filters (2) as claimed in one of the foregoing claims, and a connecting member (3) extending between the two filters (2).

On the base of the hereinabove arguments a reconsideration of the conclusions of the written opinion is kindly requested.
**INTERNATIONAL SEARCH REPORT**

**International application No**

PCT/IT2007/000346

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**A. CLASSIFICATION OF SUBJECT MATTER**

**INV. A62B23/06**

According to International Patent Classification (IPC) or to both national classification and IPC.

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**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

A62B A61M A61F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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**X** Further documents are listed in the continuation of Box C

**X** See patent family annex

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* Special categories of cited documents

1A* document defining the general state of the art which is not considered to be of particular relevance

1E* earlier document but published on or after the international filing date

1L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another document

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1S* document member of the same patent family

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Date of the actual completion of the international search

21 January 2008

Date of mailing of the international search report

29/01/2008

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Name and mailing address of the ISA

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Authorized officer

van Bilderbeek, Henk
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