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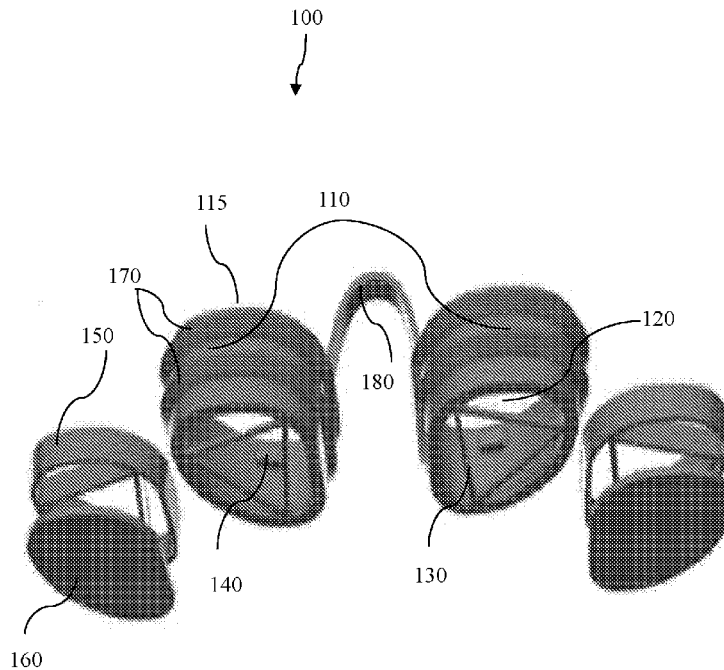


FIG. 1

(57) Abstract: A nasal filtration apparatus is disclosed. The apparatus includes a pair of housings, wherein a distal end of corresponding pair of housings is open and a proximal end of the corresponding pair of housings includes at least two rims; at least two retainers adapted to be placed inside the corresponding pair of housings. The at least two retainers and the at least two rims on each side are configured to increase air flow; at least two filters placed inside the corresponding pair of housings between corresponding at least two rims and corresponding to the at least two retainers, wherein the at least two filters are configured to restrict one or more pollutants present in the air from entering nostrils; a plurality of wings placed on an outer periphery of the pair of housings. The plurality of wings are configured to provide grip inside the nasal cavity and prevents accidental ejection.



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- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

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A NASAL FILTRATION APPARATUS

This International Application claims priority from a complete patent application filed in India having Patent Application No. 201811045380, filed on November 30, 2018 and titled "A NASAL FILTRATION APPARATUS".

5 BACKGROUND

Embodiment of a present disclosure relates to nasal filtration and more particularly to a nasal filtration apparatus.

Millions of people suffer from stuffy nose or breathing problems, uncomfortable or impossible conditions with respect to nasal physiology of breathing problems. Filtering of inhaled air is one of the primary functions of the human anterior nasal cavity and upper respiratory tract. The natural filtration mechanism includes minute hairs or cilia, which functions as a safeguard against particles being deposited in the lower airways or ultimately in the bronchi. Common illness includes allergic reaction to particular pollen particles entering the body. The particle inhalation causes asthma and emphysema. However, the natural filtration of particles, where especially particles above 10 microns are deposited on the nasal mucosa membrane, for some individuals may be an extreme nuisance, as they develop allergic responses against such particles. Hence, various artificial nasal filtration device has been introduced to reduce the above-mentioned problems faced by the people.

Furthermore, existing mechanical nasal dilators and filtration devices are generally classified as external or insertable. The external type for example attaches a cap-like structure with a filtering material to the outside of the nose with adhesives. However, some of the disadvantages of this external prior art includes; skin irritation, skin discoloration, allergic reactions, not adjustable, uncomfortable, expensive, not reusable and does not accommodate the wide variety of nose sizes and configurations. Such devices can be put on one time and cannot be reused or readjusted. If they are put on wrong way, then the device must be removed and disposed. In addition, the force and contact of the cap-like structure across the nose causes discomfort. However, insertable type nasal dilators are uncomfortable, does not consider the wide variety of nose shapes and sizes, not adjustable, irritating and not effective. In addition, most of the such devices actually reduce nasal air filtration efficiency.

Hence, there is a need for an improved nasal filtration apparatus to address the aforementioned issues.

BRIEF DESCRIPTION

This summary is provided to introduce a selection of concepts, in a simple manner, which is
5 further described in the detailed description of the invention. This summary is neither intended to identify key or essential inventive concepts of the subject matter nor to determine the scope of the invention.

In accordance with the present disclosure, a nasal filtration apparatus is disclosed. The apparatus includes a pair of housings, wherein a distal end of corresponding pair of housings is
10 open and a proximal end of the corresponding pair of housings includes at least two rims. The apparatus also includes at least two retainers adapted to be placed inside the corresponding pair of housings. The at least two retainers are configured to increase air flow. The housing is also designed to increase air flow with the introduction of a special triangular design inside the housing and retainer. The apparatus also includes at least two filters placed inside the
15 corresponding pair of housings between corresponding at least two rims and corresponding at least two retainers. The at least two filters are configured to restrict one or more pollutants present in the air from entering nostrils. The apparatus also includes a plurality of wings placed on an outer periphery of the pair of housings. The plurality of wings are configured to provide grip inside the nasal cavity and prevents accidental ejection.

20 To further clarify the advantages and features of the present invention, a more particular description of the invention will follow by reference to specific embodiments thereof, which are illustrated in the appended figures. It is to be appreciated that these figures depict only typical embodiments of the invention and are therefore not to be considered limiting in scope. The invention will be described and explained with additional specificity and detail with the
25 appended figures.

BRIEF DESCRIPTION OF DRAWINGS

The disclosure will be described and explained with additional specificity and detail with the accompanying figures in which:

FIG. 1 illustrates a schematic representation of a nasal filtration apparatus in accordance with
30 an embodiment of the present disclosure; and

FIG. 2 is a schematic representation of a nasal filtration apparatus with a plurality of wings which is an exemplary embodiment of a nasal filtration apparatus of FIG. 1 in accordance with an embodiment of the present disclosure.

FIG. 3 is a schematic representation of one embodiment of a nasal filtration apparatus with a tread design in the outer periphery of the pair of housings in accordance with an embodiment of the present disclosure.

Further, those skilled in the art will appreciate that elements in the figures are illustrated for simplicity and may not have necessarily been drawn to scale. Furthermore, in terms of the construction of the device, one or more components of the device may have been represented in the figures by conventional symbols, and the figures may show only those specific details that are pertinent to understanding the embodiments of the present invention so as not to obscure the figures with details that will be readily apparent to those skilled in the art having the benefit of the description herein.

DETAILED DESCRIPTION OF THE INVENTION

For the purpose of promoting an understanding of the principles of the invention, reference will now be made to the embodiment illustrated in the figures and specific language will be used to describe them. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended. Such alterations and further modifications in the illustrated system, and such further applications of the principles of the invention as would normally occur to those skilled in the art are to be construed as being within the scope of the present invention. It will be understood by those skilled in the art that the foregoing general description and the following detailed description are exemplary and explanatory of the invention and are not intended to be restrictive thereof.

The terms "comprises", "comprising", or any other variations thereof, are intended to cover a non-exclusive inclusion, such that one or more devices or sub-systems or elements or structures or components preceded by "comprises... a" does not, without more constraints, preclude the existence of other devices, sub-systems, elements, structures, components, additional devices, additional sub-systems, additional elements, additional structures or additional components. Appearances of the phrase "in an embodiment", "in another embodiment" and similar language throughout this specification may, but not necessarily do, all refer to the same embodiment.

Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by those skilled in the art to which this invention belongs. The system, methods, and examples provided herein are only illustrative and not intended to be limiting.

Embodiments of the present disclosure relates to a nasal filtration apparatus. The apparatus
5 includes a pair of housings, wherein a distal end of corresponding pair of housings is open and a proximal end of the corresponding pair of housings includes at least two rims. The apparatus also includes at least two retainers adapted to be placed inside the corresponding pair of housings. The at least two retainers together with the housing is configured to increase air flow. The housing is also designed to increase air flow with the introduction of a special triangular
10 design inside the housing and retainer. The apparatus also includes at least two filters placed inside the corresponding pair of housings between corresponding at least two rims and corresponding to the at least two retainers. The at least two filters are configured to restrict one or more pollutants present in the air from entering nostrils. The apparatus also includes a plurality of wings placed on an outer periphery of the pair of housings. The plurality of wings
15 are configured to provide grip inside the nasal cavity and prevents accidental ejection.

FIG. 1 illustrates a schematic representation of a nasal filtration apparatus (100) in accordance with an embodiment of the present disclosure. The apparatus (100) includes a pair of housings (110), wherein a distal end (115) of corresponding pair of housings (110) is open and a proximal end (120) of the corresponding pair of housings (110) includes at least two rims (130). In one
20 embodiment, the pair of housings (110) are fabricated using a medical graded thermo plastic material with additives which make the product anti-microbial. In such embodiment, a variation of the pair of housings (110) are designed to substantially match a shape of an inner surface of the nostrils of a user.

An inner periphery of the pair of housings (110) includes a plurality of flanges (140). The
25 plurality of flanges (140) are configured to hold the at least two retainers (150). The plurality of flanges (140) are disposed at a similar vertical height away from bottom of the inner periphery of the pair of housings (110).

The apparatus (100) also includes at least two retainers (150) adapted to be placed inside the corresponding pair of housings (110). The at least two retainers (150) are configured to increase
30 air flow. In one embodiment, the corresponding pair of housings (110) may be also designed to increase air flow with the introduction of a special triangular design inside the corresponding pair of housings (110) and the at least two retainers (150). In a specific embodiment, each of

the at least two retainers (150) includes one or more lines and the one or more lines are connected in a shape of triangle to provide strength and increase air flow.

The apparatus (100) also includes at least two filters (160) placed inside the corresponding pair of housings (110) between corresponding at least two rims (130) and corresponding to the at least two retainers (150). The at least two filters (160) are configured to restrict one or more pollutants present in the air from entering nostrils. In one embodiment, the at least two filters (160) are fabricated using a nanofiber material, a microfiber material, a woven fabric or a non-woven fabric. In such embodiment, each of the at least two filters (160) is a replaceable filter. The at least two filters (160) are designed to sandwich between the corresponding rims (130) and the corresponding at least two retainers (150) and works with one or more types of filter material so that a consumer has the option of deciding a type of protection or filter efficacy as per requirement.

In one embodiment, the at least two filters (160) may be fabricated using a single layer of filtering material. In another embodiment, the at least two filters (160) may be fabricated using one or more layers of filtering material.

The apparatus (100) also includes a plurality of wings (170) placed on an outer periphery of the pair of housings (110). One such embodiment of the plurality of wings (170) of the nasal filtration apparatus (100) of FIG. 1 is shown in FIG.2.

FIG. 2 is a schematic representation of an exemplary nasal filtration apparatus (200) with the plurality of wings (170) in accordance with an embodiment of the present disclosure. The exemplary nasal filtration apparatus (200) is substantially similar to the nasal filtration apparatus (100) of FIG. 1. The plurality of wings (170) are configured to provide grip inside the nasal cavity and prevents accidental ejection. In one embodiment, the plurality of wings (170) includes a plurality of collapsible wings which are tilted and pointed outside and collapses during insertion and expands during removal. The plurality of wings (170) provides additional grip of the pair of housings (110) which prevents accidental ejection during exercise or during sports and any strenuous condition or activity where exhaling power increases. The plurality of wings (170) shrinks or collapses during insertion so that the nasal filter (160) slides into the nasal cavity easily. Similarly, the plurality of wings (170) expands outwards during removal making the accidental ejection of the apparatus (100) difficult.

Referring to FIG.1, the apparatus (100) further includes a connector (180) mechanically coupled to a first side of each of the at least two pair of the housings (110). In such embodiment, the

connector (180) includes a bend corresponding to a nasal septum of the user, wherein the bend is configured to provide support with comfort when inserted into the nostrils. In another embodiment, the connector (180) may include a flexible U-shaped connector. In such embodiment, the U-shaped connector may be fabricated from a transparent material in order to avoid visibility while wearing the apparatus by the user. In yet another embodiment, the connector (180) may include a V-shaped connector. In one embodiment, the connector (180) may include a C-shaped connector. In some embodiment, the transparent material may include a silicone or the thermoplastic elastomer. The user wearing the nasal filtration apparatus (100) may be able to remove the apparatus (100) by pulling the connector (180) outwards.

FIG. 3 is a schematic representation of one embodiment of a nasal filtration apparatus with a plurality of wings with a treaded design in accordance with an embodiment of the present disclosure. The exemplary nasal filtration apparatus (300) is substantially similar to the nasal filtration apparatus (100) of FIG. 1. The outer periphery of the pair of housings includes a plurality of wings which is configured to provide grip inside the nasal cavity and prevents accidental ejection. In one embodiment, the plurality of wings includes a plurality of collapsible wings which are tilted and pointed outside and collapses during insertion and expands during removal as shown in FIG. 2. In another embodiment, the outer periphery of the pair of housings includes a tread pattern (175) towards the proximal end. In one embodiment, the tread pattern (175) includes a tread pattern 1 (176) as shown in FIG. 3 with wider tread pattern to provide additional grip to prevent the accidental ejection. In another embodiment, the tread pattern (175) includes a tread pattern 2 (177) as shown in FIG. 3 with narrower tread pattern to provide to prevent the accidental ejection. The tread pattern (175) also prevents accidental ejection during exercise or during sports and any strenuous condition or activity where exhaling power increases.

Various embodiments of the present disclosure enable the user to solve a plurality of problems such as nasal allergies, air pollution by inhalation of impure air through nose, snoring and sleep apnea by using the nasal filtration apparatus.

Moreover, the present disclosed apparatus is user-friendly as such apparatus reduces skin irritation, skin discoloration, by avoiding allergic reactions. Also, such apparatus is adjustable, comfortable, less-expensive, and accommodates the wide variety of nose sizes and configurations.

Furthermore, the present disclosed apparatus includes a replaceable filter which helps the user to decide and use the one or more types of filter material as per type of protection and filter efficacy the user requires.

5 In addition to, the present disclosed apparatus also includes the plurality of wings on the outer periphery of the pair of housings which provides additional grip inside the nasal cavity and prevents accidental ejection.

It will be understood by those skilled in the art that the foregoing general description and the following detailed description are exemplary and explanatory of the disclosure and are not intended to be restrictive thereof.

10 While specific language has been used to describe the disclosure, any limitations arising on account of the same are not intended. As would be apparent to a person skilled in the art, various working modifications may be made to the method in order to implement the inventive concept as taught herein.

15 The figures and the foregoing description give examples of embodiments. Those skilled in the art will appreciate that one or more of the described elements may well be combined into a single functional element. Alternatively, certain elements may be split into multiple functional elements. Elements from one embodiment may be added to another embodiment. For example, the order of processes described herein may be changed and are not limited to the manner described herein. Moreover, the actions of any flow diagram need not be implemented in the
20 order shown; nor do all of the acts need to be necessarily performed. Also, those acts that are not dependent on other acts may be performed in parallel with the other acts. The scope of embodiments is by no means limited by these specific examples.

WE CLAIM:

1. A nasal-filter apparatus (100) comprising:

a pair of housings (110), wherein a distal end (115) of corresponding pair of housings (110) is open and a proximal end (120) of the corresponding pair of housings (110) comprises at least two rims (130);

at least two retainers (150) adapted to be placed inside the corresponding pair of housings (110) wherein the at least two retainers (150) together with the at least two rims (130) are configured to increase air flow;

at least two filters (160) placed inside the corresponding pair of housings (110) between corresponding at least two rims (130) and corresponding to the at least two retainers (150), wherein the at least two filters (160) are configured to restrict one or more pollutants present in the air from entering nostrils; and

a plurality of wings (170) placed on an outer periphery of the pair of housings (110), wherein the plurality of wings (170) are configured to provide grip inside the nasal cavity and prevents accidental ejection.

2. The apparatus (100) as claimed in claim 1, wherein the pair of housings (110) are fabricated using a medical graded thermo plastic material.

3. The apparatus (100) as claimed in claim 1, wherein a variation of the pair of housings (110) are designed to substantially match a shape of an inner surface of the nostrils of a user.

4. The apparatus (100) as claimed in claim 1, wherein an inner periphery of the pair of housings (110) comprises a plurality of flanges (140), wherein the plurality of flanges (140) are configured to hold the at least two retainers (150).

5. The apparatus (100) as claimed in claim 1, wherein the plurality of wings (170) comprises a plurality of collapsible wings which are tilted and pointed outside and collapses during insertion and expands during removal.

6. The apparatus (100) as claimed in claim 1, wherein the outer periphery of the pair of housings (110) towards the proximal end (120) comprises a tread pattern (175) configured to provide extra grip inside the nasal cavity and prevents accidental ejection.

7. The apparatus (100) as claimed in claim 1, wherein each of the at least two retainers (150) and the at least two rims (130) comprises one or more lines and the one or more lines are connected in a shape of triangle to provide strength and increase air flow.
8. The apparatus (100) as claimed in claim 1, wherein the at least two filters (160) are
5 fabricated using nanofiber material, microfiber material or non- woven fabric.
9. The apparatus (100) as claimed in claim 1, wherein each of the at least two filters (160) comprises a replaceable filter.
10. The apparatus (100) as claimed in claim 1, further comprising a connector (180) mechanically coupled to a first side of each of the at least two housings (110).
- 10 11. The apparatus (100) as claimed in claim 9, wherein the connector (180) comprises a bend corresponding to a nasal septum of the user, wherein the bend is configured to provide support with comfort when inserted into the nostrils.

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100
↓

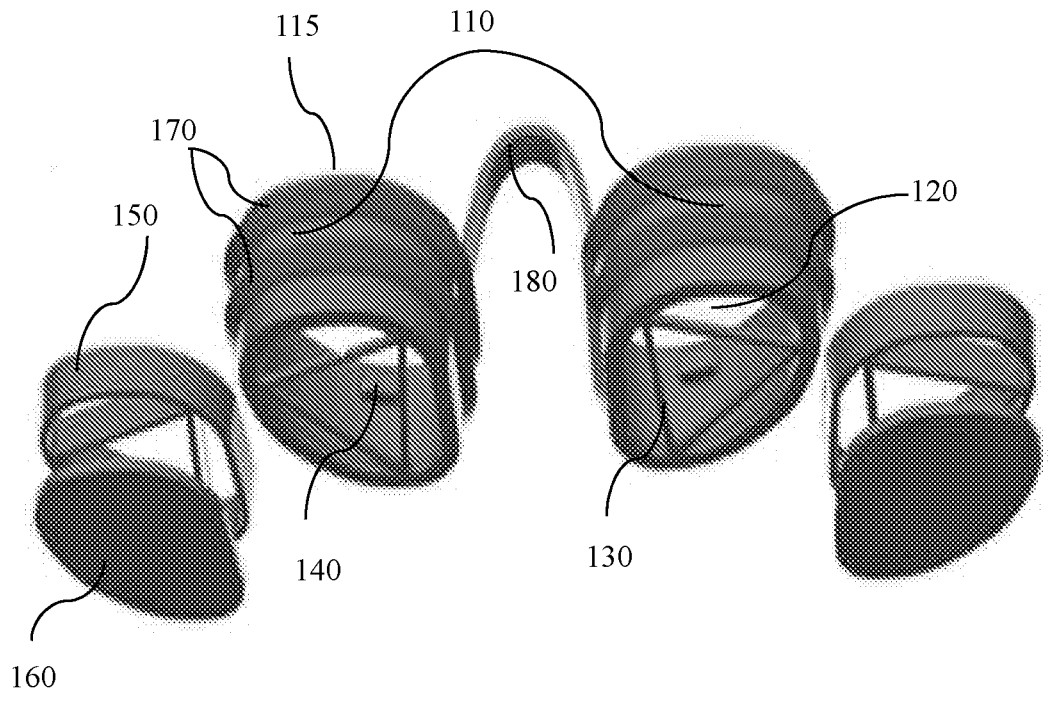


FIG. 1

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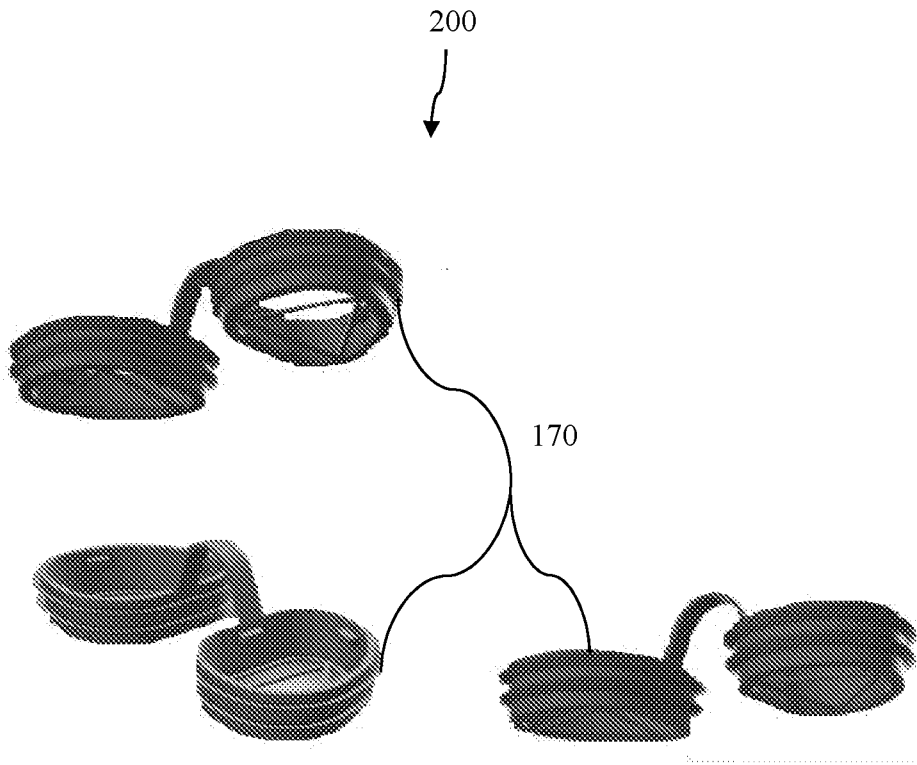


FIG. 2

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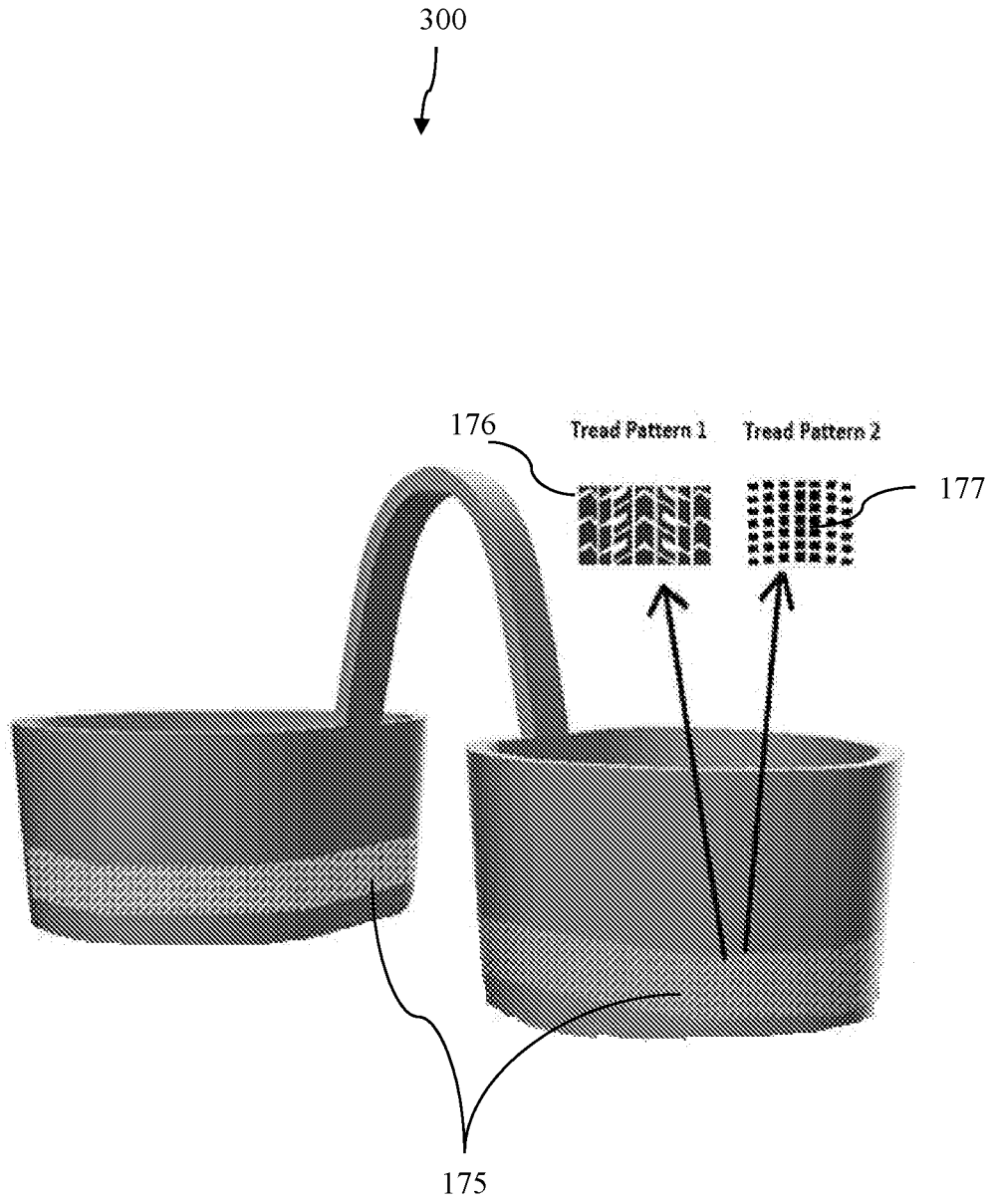


FIG. 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB2019/054890

A. CLASSIFICATION OF SUBJECT MATTER

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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A62B

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

TotalPatent One, IPO Internal Database

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2008139499 A1 (NARCISCO, PAOLO) 20 NOV 2008 (20.11.2008) Page:2 line 18- Page 4 line 2; Figures: 1,2;	1-11
Y	US 7918224 B2 (AIRWARE, INC.) 05 APR 2011 (05.04.2011) Col.8 line 65- Col.9 line 20; Figure:9; Col.11 line 51- Col.12 line 5; Col.10 lines 25-28; Col.7 lines 21-26; Figure:9, 21-24;	1-11
Y	CN 204182044 U (WUHU BOMAI NEW MATERIAL TECHNOLOGY CO LTD) 04 MAR 2015 (04.03.2015) Figure: 1,4; Claim 1;	1-11
Y	WO 2004069110 A1 (VANGSGAARD, Jorgen) 19 AUG 2004 (19.08.2004) Figure: 1, Abstract;	6

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

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"&" document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

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Citation	Pub.Date	Family	Pub.Date
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