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(54) Title: CLEANING IMPLEMENT

(57) **Abstract:** An interior cleaning implement has a dry fibrous base material. An antigenicity-reducing component is applied to the fibrous base material. Preferably, the antigenicity-reducing component is an extract of an *Olea* or a *Ligustrum* plant extracted with water or an organic solvent.



WO 2006/028273 A1

DESCRIPTION
CLEANING IMPLEMENT

TECHINICAL FIELD

5 The present invention relates to an interior cleaning implement having a fibrous base material. More specifically, the present invention relates to a cleaning implement that can reduce the antigenicity of substances that can provoke allergies.

10 Priorities are claimed on Japanese Patent Applications No. 2004-262896, filed September 9, 2004, No. 2004-262897, filed September 9, 2004, No. 2004-341804, filed November 26, 2004, and No. 2004-358953, filed December 10, 2004, the contents of which are incorporated herein by reference.

15

BACKGROUND ART

 In recent years, there has been a steady increase in the number of people afflicted with allergic diseases such as allergic rhinitis and bronchial asthma. Substances that
20 provoke these allergic diseases are referred to as allergens, of which 200 types have been discovered. Mites, dead mite parts, pet hair, and pollen are typical examples. These can provoke various allergic reactions through contact with or entry into the body.

25 In these cases, using chemicals or the like to kill the mites and the like that provoke allergies does not provide a complete solution since the dead mite parts are also antigenic. Thus, reducing allergic reactions and preventing new sensitivities from developing requires
30 either completely removing allergens from the living space or reducing the antigenicity of substances that provokes allergies by denaturing allergens or the like.

 Examples of an agent for reducing antigenicity of allergy-inducing substances as described above that have

been disclosed include allergen inactivating agents made from *Olea europaea* and/or *Ligustrum obtusifolium* (Japanese Patent Application Laid-open number 2003-55122, hereinafter called Patent Document 1).

5 Also, there have been disclosed allergen-reducing agents in forms that can be applied or dispersed in an aqueous state onto floors, carpets, and floor mats in the form of an aqueous solution containing aluminum sulfate and sodium sulfate as the active components as an example of an
10 agent for reducing allergens (Japanese Patent Application Laid-open number 2003-334240, hereinafter called Patent Document 2).

 With cleaning implements such as dust cloths, mops, and wipers used to remove indoor dust and particles,
15 allergens adhere to the cleaning implement during cleaning and remain on the cleaning implement for extended periods. As described above, reducing or preventing allergic reactions would require reducing the antigenicity of the allergens on the cleaning implement.

20 However, the agents in Patent Document 1 and 2 are all used by applying or dispersing them directly at location that may come into contact with the body, e.g., floor mats, carpets, floors, and clothes. This makes it necessary to wipe away the agent or to remove it with a vacuum cleaner
25 after application, resulting in a burden on the user. Easy elimination of allergy-inducing substances in the cleaning of dust and particles on floors and furniture that are cleaned most often has not been investigated. Also, since the conventional methods moisten the object being cleaned,
30 the object must then be dried. Furthermore, no research has been done on reducing antigenicity of allergy-inducing substances contained in dust and particles collected on cleaning implements having fibrous materials such as mops.

More specifically, with interior cleaning implements, ones which are disposable and replaceable, and equipped with fibrous base materials in sheet or brush form that contain essentially no moisture, have been well-received on the market. With these cleaning implements, there is a need for the antigenicity-reducing composition to be adhesive to and permeable in the fibrous base material, and the transfer of the composition to the object being cleaned must be minimal.

Here, Patent Document 1, and Patent Document 2 do not take into account the adhesiveness or the permeability of the composition.

DISCLOSURE OF INVENTION

An object of the present invention is to overcome these problems and to provide a cleaning implement that can reduce the antigenicity of allergy-inducing substances adhered to the cleaning implement.

Based on careful research into overcoming the problems described above, the present inventor determined that the problems can be solved by applying an antigenicity-reducing component on the cleaning implement, resulting in the present invention. More specifically, the present invention provides the following.

(1) A cleaning implement for interior cleaning has a fibrous base material; and an antigenicity-reducing component for reducing antigenicity of allergy-inducing substances.

Since the cleaning implement of the invention, is provided with an antigenicity-reducing component, the cleaning implement can reduce antigenicity of allergy-inducing substances attached on the cleaning implement. It is also easy to apply the antigenicity-reducing component

on the fibrous base material. Furthermore, by applying less component, transfer of the component during cleaning from the fibrous base material to the object being cleaned can be prevented.

- 5 (2) The cleaning implement according to (1) is one in which the antigenicity-reducing component has been provided to the fibrous base material as a solution into which the antigenicity-reducing component is dissolved.

10 In these forms, applying small amount of the antigenicity-reducing component, in a liquid state can be uniformly applied on the cleaning implement, by adjusting the amount of solvent. The cleaning implement may have a solution including the dissolved antigenicity-reducing component, or, the cleaning implement may have the
15 antigenicity reducing component without a solvent, as a result, the solvent has vaporized out of solution after the solution had applied to the cleaning implement.

- 20 (3) The cleaning implement according to (1) or (2) is one in which the antigenicity-reducing component is aqueous or hydrophilic, and also, (4) the cleaning implement according to one of (1) to (3) is one in which the antigenicity-reducing component is a plant extract component.

25 In these forms, the antigenicity-reducing component is aqueous or hydrophilic or is plant-derived, thus providing a high degree of safety to humans.

- 30 (5) The cleaning implement according to one of (1) to (4) is one in which the antigenicity-reducing component is an extract from an *Olea* or *Ligustrum* plant extracted by using water or an organic solvent.

According to this, since extracts from an *Olea* or *Ligustrum* plant extracted by using water or an organic solvent (hereinafter referred to as olive extracts) provide

superior antigenicity-reducing qualities, antigenicity can be reduced even by the application of small amounts. Also, some types of conventional plant-derived antigenicity-reducing components themselves have color, thus leading to problems when application results in discoloring of the base material. However, since the olive extract itself is yellow to yellowish-brown in color, it becomes almost transparent when it has been diluted and applied to the fibrous base material, thus preventing discoloring of the base material.

(6) The cleaning implement according to one of (1) to (5) is one in which the antigenicity-reducing component is oleuropein.

The oleuropein used here is a phenolic iridoid glycoside found in large quantities in *Olea* and *Ligustrum* plants. This iridoid glycoside contains a formyl group and hydroxy group, and it is believed that these bind with amino groups contained in an allergen protein to reduce antigenicity.

(7) The cleaning implement according to (5) or (6) is one in which the fibrous base material is white.

With this, since the olive extract and oleuropein described above have little coloring, there is no problem with the fibrous base material being discolored. As a result, since white fibrous base materials can be used as in the past, adhered dust and particles can be easily recognized.

(8) The cleaning implement according to one of (1) to (7) is one in which the antigenicity-reducing component is equal to or more than 0.001 percent by mass and less than or equal to 10 percent by mass relative to 100 parts by mass of the fibrous material.

By having the antigenicity-reducing component be at least 0.001 percent by mass relative to the entire fibrous base material, adequate antigenicity reduction can be achieved, and a suitable effect can be provided with a very small amount of the antigenicity-reducing component. Also, a proportion greater than 10 percent by mass results in instability over time in the antigenicity-reducing component.

The present invention is able to provide a cleaning implement that can reduce the antigenicity of allergy-inducing substances adhering to the cleaning implement.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an exploded drawing showing an example of a cleaning tool according to the present invention.

Fig. 2 is an exploded perspective drawing of the fibrous base material in Fig. 1.

Fig. 3 is a perspective drawing showing another example of a cleaning tool according to the present invention.

Fig. 4 is a perspective drawing showing another example of a cleaning tool according to the present invention.

BEST MODE FOR CARRYING OUT THE INVENTION

Next, embodiments of the present invention shall be described referring to the drawings.

Antigenicity-Reducing Component

The "antigenicity-reducing component" used in the present invention inhibits allergic reactions by reducing the antigenicity of allergy-inducing substances. It would be preferable for the component to be a plant-derivative component. The allergy-inducing substances (allergens) can be, e.g., inhaled allergens such as from cedar pollen,

grass pollen, mites, house dust, animals, fungi (mold), and insects.

There are no special restrictions on the specific antigenicity-reducing components used, but examples include

5 olive extracts, privet extracts, and extracts from pomegranate, neem, persimmon, tea, bamboo, perilla, peppermint, Japanese Hinoki cypress (*Chamaecyparis obtusa*), Hiba arborvitae (*Thujopsis dolabrata*), eucalyptus, tea tree, and the like. Examples of extracted compounds include:

10 tannic acid, gallic acid, and the like. Other examples include: high molecular weight compounds in which a side chain of a linear high molecular weight repeating unit includes a phenol group that is monovalent or higher such as poly (para-vinyl phenol); high molecular weight

15 compounds in which a side chain of linear high molecular weight repeating units includes a phenol group that is monovalent such as dioxybenzoic acid polymer; a polyoxyethylene chain such as disodium lauryl diphenyl ether disulfonic acid and/or a benzene sulfonate that is

20 bivalent or higher and includes an ethylene chain in its molecule, and/or a hydroxybenzoic acid such as a sulfate that is bivalent or higher and includes an ethylene chain in its molecule, alcohol includes terpene skeleton, a hydroxy benzoate such as 2,5-dihydroxy benzoate, or the

25 like; an aromatic hydroxy compound; a carbonate of an alkali metal; alum; lauryl benzene sulfonic acid; lauryl sulfate; polyoxyethylene lauryl ether sulfate; phosphate; zinc sulfate and/or lead acetate; and the like.

Of the components above, it would be preferable for

30 the antigenicity-reducing component to be based on an olive extract. The "olive extract" of the present invention is extracted from an *Olea* or *Ligustrum* plant using water or an organic solvent. Also, it would be preferable for the

antigenicity component to be oleuropein. Oleuropein is an iridoid glycoside. Iridoid glycosides can have a formyl group and a hydroxy group. It is believed that these bind with the amino group contained in the allergen protein to
5 reduce antigenicity. A specific example of this type of olive extract is indicated in Patent Document 1 above.

Also, it is believed that tannic acid reduces antigenicity by the hydroxy group in polyphenol bonding with the amino group and the peptide section of the
10 allergen protein.

The antigenicity-reducing components described above may be provided as a solution (hereinafter referred to as antigenicity-reducing agent) containing an active ingredient such as oleuropein, a fluid extract thereof, and
15 the like. For example, the olive extract described above is one example of antigenicity-reducing agent and it would also be possible to use the extract as the antigenicity-reducing agent containing ethanol and water besides oleuropein.

20 Components other than the antigenicity-reducing component described above can also be used in the cleaning implement of the present invention as long as they do not significantly alter the characteristics. Other components can be mixed with the antigenicity-reducing component
25 before application, and also may be applied separately from the antigenicity-reducing component. For example, auxiliary substance may be added to antigenicity-reducing component, in order to increase the reactivity of the antigenicity-reducing component. Auxiliary substance, can
30 be hygroscopic composition such as alkaline earth metal salt.

Examples of the components other than the antigenicity-reducing component are lubricants or

surfactants. The "surfactant" used in the present invention is added to allow easy application of the antigenicity-reducing component to the cleaning implement and to make the application uniform. It would be
5 preferable to use a nonionic activator. With the nonionic activator, the antigenicity-reducing component can be mixed with a lubricant in a stable manner.

There are no special restrictions on the nonionic surfactants, but examples of preferable polyoxyethylene
10 alkyl ether include: polyoxyethylene lauryl ether; polyoxyethylene cetyl ether; polyoxyethylene oleyl ether; and polyoxyethylene stearyl ether. Examples of preferable sorbitan esters include: sorbitan laurate monoester; sorbitan monoester of palmitic acid; sorbitan monoester of
15 stearic acid; and sorbitan monoester of oleic acid. Examples of preferable glycerine fatty acid esters include: glyceryl monomyristate acid; glyceryl mono stearate; glyceryl mono oleate; glyceryl mono isostearate; and glyceryl di oleate. Examples of preferable vegetable oils
20 include: jojoba oil; avocado oil; olive oil; persic oil; grape seed oil; safflower oil; and sunflower oil. Examples of sorbitan trioleate include: sorbitan triester of stearic acid; and sorbitan triester of oleic acid. Examples of preferable ethylene oxide (EO) additives to castor oil or
25 hydrogenated castor oil include: polyoxyethylene hydrogenated castor oil; lauric acid polyoxyethylene hydrogenated castor oil; and mono isostearic acid polyoxyethylene hydrogenated castor oil. These surfactants can be used independently or two or more types can be mixed.

30 A dust-adhesive lubricant or a mineral oil can be used as the lubricant. Adhesion of the antigenicity-reducing component to the fibrous base material is made easier by using the lubricant. Also, disengagement of the

antigenicity-reducing component from the fibrous base material to which it is applied and transfer to the object being cleaned can be effectively prevented. Also, dust collection is improved and dust is prevented from falling
5 away once it is collected.

The "lubricant" used in the present invention is added to increase adsorption and retention of dust and particles. There are no particular restrictions on the type of the lubricant, but it would be preferable to include at least
10 one out of the following: mineral oil; synthetic oil; silicone oil; and plant oil. Examples of the mineral oil include paraffin-based hydrocarbons, naphthene-based hydrocarbons, and aromatic hydrocarbons. These lubricants can be used independently or two or more types can be mixed.

15 Of these, using liquid paraffin as the main component of the lubricant is preferable because it makes adhesion of the antigenicity-reducing component to the fibrous base material easier. Furthermore, once the antigenicity-reducing component is applied to the fibrous base material,
20 the component is prevented from disengaging and getting caught in the object being cleaned.

It would be preferable for the viscosity of the mineral oil to be from 10 to 200 mm²/s at 30 degrees C, and from 15 to 120 mm²/s more preferably. If the viscosity is
25 less than 10 mm²/s, it may be transferred excessively to the object being cleaned and can adhere to hands, resulting in a sticky feeling. If the viscosity exceeds 200 mm²/s, dust adhesion is reduced.

Cleaning Implement

30 Next, a cleaning implement to which the above antigenicity-reducing component is applied will be described. There are no special restrictions on the cleaning implement, and a "dry-type" cleaning implement,

i.e., an interior cleaning implement having a fibrous base material that contains essentially no water is preferable. For example, the cleaning implement can be sheet-shaped or the sheet can be cut in strips, can be formed from multiple string-shaped elements, or can be a tow of fibers (a fiber assembly). The cleaning implement can be a cleaning tool having the fibrous material and a handle, such as a mop. There are also no special restrictions on the fibrous base material, which can be formed from natural fiber, synthetic fiber, or semi-synthetic fiber. Also, there are no special restrictions on the form of the fiber, which can be woven, knitted, or nonwoven.

A "dry-type" cleaning implement being applied with an antigenicity-reducing composition including at least an antigenicity-reducing component and a lubricant is a cleaning implement in which the proportion of the lubricant is bigger than the moisture, and a proportion of 5.0% moisture or less would be appropriate. The moisture must be solubilized in the lubricant. If the lubricant is emulsified, dust collection performance is reduced, making it undesirable.

Examples of Cleaning Tool

Fig. 1 and Fig. 2 show an example of this type of cleaning tool. Fig. 1 is an exploded drawing of the cleaning tool. Fig. 2 is an exploded perspective drawing of a cleaning sheet from Fig. 1. A cleaning tool 10 is a "handy-type" cleaning tool and is formed from: a cleaning sheet 11, which corresponds to a fibrous base material of the present invention; and a grasping tool 12. The grasping tool 12 is replaceable. For example, a grasping tool 22 shown in Fig. 3 can be mounted to allow the cleaning tool in Fig. 1 to be used in high places or narrow places that are difficult to reach.

As shown in Fig. 2, the cleaning sheet 11 is formed from the following layers, starting in sequence from the top: a retained sheet 1 formed from nonwoven cloth cut into multiple strips; a base sheet 2 also formed from nonwoven cloth cut into multiple strips; a first fiber bundle 3a formed from a tow of fibers (i.e. a bunch of fibers); a second fiber bundle 3b formed from a tow of fibers; a third fiber bundle 3c formed from a tow of fibers; a fourth fiber bundle 3d formed from a tow of fibers; and a strip sheet 5 in which multiple strips are formed. In this embodiment, the first fiber bundle 3a, the second fiber bundle 3b, the third fiber bundle 3c, and the fourth fiber bundle 3d form the brush section of the present invention. Thus, this brush section provides more effective cleaning. Since the antigenicity-reducing component need only be applied to this brush section, the antigenicity-reducing component can be applied more efficiently. The "brush section" referred to here is the section that performs the primary cleaning function in the cleaning implement of the present invention. The brush section can be a portion or all of the fibrous base material. The retained sheet 1, the base material sheet 2, the first fiber bundle 3a, the second fiber bundle 3b, the third fiber bundle 3c, the fourth fiber bundle 3d, and the strip sheet 5 are all bonded together at a layer bonding line 6. At bonding lines 7, only the retained sheet 1, the base material sheet 2, the first fiber bundle 3a, and the second fiber bundle 3b are bonded. As a result, a holding space 13 is formed between the retained sheet 1 and the base material sheet 2, allowing the grasping tool 12 to be inserted and mounted. In these types of "handy-type" cleaning tool 10 and 20, it would be preferable for the antigenicity-reducing component to be applied only to the brush section formed from the first fiber bundle 3a,

the second fiber bundle 3b, the third fiber bundle 3c, and the fourth fiber bundle 3d.

Another Example of a Cleaning Tool

Fig. 4 shows another example of a cleaning tool in the form of a floor-type cleaning tool 30 suitable for cleaning floors. As shown in Fig. 4, in this cleaning tool 30 a cleaning sheet 31 corresponding to the fiber base material of the present invention is wrapped around an end 32a of a grasping tool 32 and used. Projections 33 made from tows (grouped fiber) are formed on the front and back of the cleaning sheet 31. This makes it easier to clean places that would be difficult to clean with a flat tool, e.g., grooves. By simply placing the cleaning tool 30 in contact with a floor or the like, the cleaning sheet 31 is able to collect particles and the like. In this type of "floor-type" cleaning tool 30, it would be preferable to apply the antigenicity-reducing component to the entire cleaning sheet 31.

Application of Antigenicity-Reducing Component

Examples of methods for applying the antigenicity-reducing component to the cleaning implement described above include spraying or roller-coating the antigenicity-reducing component onto the fibrous base material, immersion, and the like, but the present invention is not restricted to these methods. Also, the antigenicity-reducing component may be applied as antigenicity-reducing component diluents, in which the antigenicity-reducing component is diluted in water or an organic solvent, due to small applying amount of antigenicity-reducing component. In this case, solvent of antigenicity-reducing component diluents, vaporized after application, resulting in production of cleaning implement with applied antigenicity-reducing component.

The amount of applying antigenicity-reducing component is preferably no less than 0.001 and no more than 10% by mass relative to the entire fibrous base material. More preferably, the amount of antigenicity reducing component, of no less than 0.002 and no more than 1 % by mass.

Applying antigenicity-reducing component of less than 0.001% by mass is not preferable because antigenicity reduction rate relative to the dust collected is not enough. On the other hand, stableness per day of antigenicity-reducing component become unstable, and the cooling implement becomes expensive as antigenicity-reducing component become more than 10 % by mass.

The antigenicity-reducing component may be mixed/agitated using conventional known methods with other components described above to form an antigenicity-reducing composition and then, applied to the cleaning implement. When the antigenicity-reducing component is mixed with the lubricant and the surfactant to form the antigenicity-reducing composition, the preferable proportions relative to the overall antigenicity-reducing composition are as follows: in the range from 0.01 to 10 percent by mass of the antigenicity-reducing component; in the range from 50 to 95 percent by mass of the lubricant; and in the range from 1 to 49.99 percent by mass of the surfactant. More preferable is: in the range from 0.02 to 1 percent by mass of the antigenicity-reducing component; in the range from 60 to 79.98 percent by mass of the lubricant; and in the range from 20 to 40 percent by mass of the surfactant.

In the case in which the antigenicity-reducing component is applied to the cleaning implement in the form of an antigenicity-reducing composition, less than 0.01 percent by mass of the antigenicity-reducing component is not preferable since the antigenicity reduction for the

collected particles is inadequate. A proportion greater than 10 percent by mass of the antigenicity-reducing component results in instability over time in the antigenicity-reducing composition and also increases cost.

5 Using less than 50 percent by mass of the lubricant is not preferable since the effect in the adhesion of dust and the like, exerted by the lubricant becomes inadequate. A proportion greater than 95 percent by mass of the lubricant results in instability over time in the antigenicity-
10 reducing composition and is therefore not preferable.

 Using less than 1 percent by mass of the surfactant is not preferable because of instability over time in the antigenicity-reducing composition. More than 50 percent by mass reduces the amount of lubricant that can be added and
15 is therefore not preferable.

 It is preferable to apply the antigenicity-reducing composition to the entire fibrous base material in a proportion ranging from 1 to 15 percent by mass. By applying the antigenicity-reducing composition of at least
20 1 percent by mass relative to the entire fibrous base material, adequate antigenicity reduction can be provided. Since the proportion of antigenicity-reducing component that is added in this case would be from 0.0001 to 1.5 percent by mass, a suitable effect can be provided with a
25 very small amount of the antigenicity-reducing component by applying the antigenicity-reducing component being contained in the antigenicity-reducing composition.

 By having the antigenicity-reducing composition be 15 percent by mass or less relative to the entire fibrous base
30 material, transfer of the antigenicity-reducing composition to the object being cleaned due to excessive adhesion of the antigenicity-reducing composition can be prevented.

When the antigenicity-reducing component is applied in the form of the antigenicity-reducing composition for a "handy-type" cleaning tool as shown in Fig. 1, it would be preferable to apply the antigenicity-reducing composition at 1 to 10% by mass relative to the entire fibrous base material. Applying less than 1% by mass is not preferable since it prevents dust particles from being completely picked up. At more than 10% by mass, the composition is transferred excessively to the object being cleaned and is also transferred to the hands, resulting in a sensation of stickiness.

In a floor-type cleaning tools as shown in Fig. 4, however, it would be preferable to apply slightly more composition, i.e., in the range from 3 to 15% by mass relative to the entire fibrous base material, and it would be more preferable to apply from 3 to 10% by mass. If the amount applied is within this range, it is easier for at least a portion of the antigenicity-reducing composition to be transferred to the object being cleaned. As a result, antigenicity reduction with the cleaning tool as described above is improved, while the antigenicity-reducing composition that has been transferred to and left on the object being cleaned is also able to reduce antigenicity. Thus, antigenicity reduction can be provided by the object being cleaned as well. Furthermore, since the oil in the antigenicity-reducing composition is transferred to the object being cleaned as well, waxing is provided for the floor surface. Thus, this arrangement can be suitable for floor-type cleaning tools. If the amount of the composition applied is less than 3% by mass, dust particles are not completely picked up by the cleaning implement. Also, the transfer of the antigenicity-reducing composition to the object being cleaned is inadequate. If the amount

applied is more than 15% by mass, the transfer of the antigenicity-reducing composition to the object being cleaned is excessive. Also, the composition adheres to the hands and leads to a sensation of stickiness.

5 Examples

The present invention will be described in further detail using embodiments and comparative examples. The present invention, however, is not restricted to the embodiments described below.

10 First to Third Embodiment and First Comparative example Making Antigenicity-Reducing Agents Containing Antigenicity-Reducing Components Olive Extract

Extraction was performed on the leaves of the olive
15 plant using water, based on the third embodiment for making a component in Patent Document 1 (20 g of fresh olive leaves placed in 100 g water, mixed in a mixer, then filtered). Then, ethanol was added to prepare a liquid olive extract having 0.6% oleuropein.

20 Solution Having Tannic Acid

Tannic acid (from Wako Pure Chemical Industries, Ltd.) was dissolved in water and ethanol to prepare a solution having 15% tannic acid.

Making Antigenicity-Reducing Component Diluents

25 Using the two types of antigenicity-reducing agents described above, solution examples 1 to 3 of each of the antigenicity-reducing composition were mixed with water and stirred with the proportions shown in Table 1. Also, the solution example 4 with water alone was obtained.

Table 1

Amount of Antigenicity-Reducing Component Diluent (units: % by weight)

Name	Test Example	Antigenicity-Reducing Component	Water
Solution containing no antigenicity-reducing component	Solution Example 4	-	100
Solution Having Tannic Acid	Solution Example 1	1	99
	Solution Example 2	10	90
Olive Extract	Solution Example 3	10	90

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Application of the Antigenicity-Reducing Component to the Cleaning Tool

Next, the antigenicity-reducing component diluents solution examples 1 through 3 and the solution containing no antigenicity-reducing component solution example 4 were sprayed onto the cleaning tool shown in Fig. 1 (hereinafter referred to as the "handy-type"), and onto the cleaning tool shown in Fig. 4 (hereinafter referred to as the "floor-type"). For each type, a first through third cleaning tool embodiment (tools on which solution examples 1 through 3 were applied) and a first comparative example (tools on which the solution example 4 was applied) were obtained.

For the handy-type tools, 5 percent by mass of the antigenicity-reducing component diluent was applied relative to the entire fibrous base material (the sheet 11 in Fig. 1). For the floor-type tools, 7.5 percent by mass of the antigenicity-reducing component diluent was applied relative to the entire fibrous base material (the sheet 31 in Fig. 4).

Evaluation Test

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Evaluation Test 1: Evaluation of antigenicity-reducing performance

Antigenicity-reducing performance on cedar pollen and dust mites was evaluated for the first, second, and third
5 embodiments and the first comparative example using the procedure described below. The results are shown in Tables 2 and 3. In the tables, the reduction rates are determined as $100 - 100 \times (\text{allergen volume from a cleaning tool to which antigenicity-reducing agent was applied quantified}$
10 $\text{using the ELISA method}) / (\text{allergen volume from a cleaning tool to which no antigenicity-reducing agent was applied quantified using the ELISA method})$. The symbols in the tables indicate the following reduction rates:

Circle: good reduction rate (50% or more)

15 Triangle: modest reduction rate (10 to 50%)

X: inferior reduction rate (0 to 10%)

Handy-type: Debris containing approximately 0.05 g of mite allergens (dust mites) and approximately 0.01 g cedar pollen were placed in a glass bottle having a diameter of 9
20 cm and a height of 17 cm. The bottle was capped and the debris and cedar pollen were dispersed throughout the bottle. The top was removed and the handy-type cleaning tool was used to wipe away the debris and cedar pollen. An extraction fluid was used on the cleaning tool to extract
25 the allergens and the allergens were quantified using the ELISA method.

Floor-type: Debris containing approximately 0.05 g of mite allergens (dust mites) and approximately 0.01 g cedar pollen were placed on a floor panel approximately 30 cm x
30 30 cm. The debris and the cedar pollen were wiped away with the floor-type cleaning tool. An extraction fluid was used on the cleaning tool to extract the allergens and the allergens were quantified using the ELISA method.

A phosphoric acid buffering agent (pH7) was used as the extraction fluid. Also, the ELISA method (enzyme-linked immunosorbent assay) is a type of quantification method (EIA: enzyme immunoassay) that uses enzyme color formation that takes place in antigen-antibody reactions. Specifically, the Sandwich technique that uses two kinds of antibody which sandwiches the object to be detected to quantify was used.

Table 2

10 Cedar Pollen Antigenicity Reduction Rate

Test Example	Reduction rate	
	Hand-held	Floor
Comp. Example 1	×	×
Embodiment 1	Δ	Δ
Embodiment 2	○	○
Embodiment 3	○	○

Table 3

Mite Antigenicity Reduction Rate

Test Example	Reduction rate	
	Hand-held	Floor
Comp. Example 1	×	×
Embodiment 1	×	Δ
Embodiment 2	○	○
Embodiment 3	○	○

Based on the results from Table 2 and Table 3, it was found that the floor-type cleaning tools of the first to the third embodiments provided reductions with each of the antigenicity-reducing compositions. In the handy-type cleaning tool of the first embodiment, however, not as much of the antigenicity-reducing component was applied and the effect was somewhat less.

Evaluation Test 2: Evaluation of reductions after exposure to heat and light

Heating test: For the cleaning tools in the second and third embodiment, the fibrous base material was placed by itself in a paper housing and covered for the handy-type cleaning tools and in a pillow-type covering made from film for the floor-type cleaning tool. The packages were left indoors away from direct light, in a thermostatic chamber at 40 degrees C, and in a thermostatic chamber at 50 degrees C. Then, after one month, allergens were measured using the same method as in the Evaluation Test 1.

Light test: For the handy-type and floor-type cleaning tools, the sheets were left unpackaged under a xenon lamp weather meter for the equivalent of one month under sunlight and six months under sunlight. Allergens were measured using the same method as in the Evaluation Test 1.

Results are shown in Table 4, with the reduction rates and symbols in the table indicating the same things as in Tables 2, 3. For both the cleaning tools of the second and third embodiment, the reduction effect was maintained after exposure to heat for one month. The reduction effect was also maintained after exposure to sunlight.

Table 4

Mite Antigenicity Reduction Rate

Condition	Elapsed time	Embodiment 2		Embodiment 3	
		Hand-held	Floor	Hand-held	Floor
Immediately after application	0 days	○	○	○	○
RT	One month	○	○	○	○
40 deg C	One month	○	○	○	○
50 deg C	One month	○	○	○	○
Light exposure	One month equivalent	○	○	○	○
Light exposure	Six months equivalent	○	—	○	—

Fourth to Sixth Embodiments and Second Comparative Example

Antigenicity-reducing components contained in
antigenicity-reducing compositions were applied to fibrous
5 base materials in the fourth to sixth embodiments and
second comparative example. Details are described below.

Using the two types of antigenicity-reducing agents
used for the first to the third embodiments and the first
comparative example, production examples 5 to 7 of
10 antigenicity-reducing compositions were prepared using the
proportions shown in Table 5. Also, the production example
8 was prepared as a composition without an antigenicity-
reducing component.

Liquid paraffin and/or safflower oil were used as the
15 lubricant. For the surfactant, at least one of the
following was used: polyoxyethylene alkyl ether, sorbitan
monoester of oleic acid, mono isostearic acid glyceryl,
sorbitan triester of oleic acid, and polyoxyethylene
hydrogenated castor oil. In addition, water was mixed in
20 and agitated to prepare the antigenicity-reducing
composition.

Table 5

Amount of Antigenicity-Reducing Composition (units: % by weight)

Name	Test example	Poly oxyethylene alkyl ether	Sorbitan oleic acid mono ester	Liquid paraffin	Water	Antigenicity-reducing component	Glycerol mono isostearate	Safflower oil	Sorbitan oleic acid triester	Poly oxyethylene hydro genated castor oil	Poly oxyethylene alkyl ether
		Note 2)		Note 3)		Note 1)				Note 4)	Note 5)
Standard Lubricant	Solution example 4	0.8	1.2	98	-	-	-	-	-	-	-
Solution Having Tannic Acid	Solution example 1	0.8	2	92.6	0.2	0.1	1	-	0.8	1	1.5
	Solution example 2	0.7	4.8	74.4	0.2	3.9	4	2	3.5	2	4.5
Olive Extract	Solution example 3	0.7	7.5	78.3	0.2	3.9	-	-	7	-	2.4

Note 1) (Solution having tannic acid): Tannic acid (Wako Pure Chemical Industries, Ltd.) was dissolved in water and ethanol to prepare 15% tannic acid.

(Olive extract): Olive plant leaves were extracted with water based on the third compound example in Patent Document 1. Ethanol was added to so as to be adjusted to 0.6% oleuropein.

Note 2) The EO addition to the polyoxyethylene alkyl ether was 5 moles. The number of carbon atoms in the alkyl group is 12 to 14.

Note 3) 50 mm²/s viscosity at 30 degrees C.

Note 4) The EO addition to the polyoxyethylene hydrogenated castor oil was 60 moles.

Note 5) The EO addition to the polyoxyethylene alkyl ether was 3 moles. The number of carbon atoms in the alkyl group is 12 to 14.

Application of the Antigenicity-Reducing Composition to the Cleaning Tool

Next, the antigenicity-reducing composition solution examples 5 to 7 and the composition solution example 8 were sprayed onto the cleaning tool shown in Fig. 1 (hereinafter referred to as the "handy-type"), and onto the cleaning tool shown in Fig. 4 (hereinafter referred to as the "floor-type"). For each type, a fourth to sixth cleaning tool embodiment (tools on which solution examples 5 to 7 were applied) and a second comparative example (tools on which the solution example 8 was applied) were obtained.

For the handy-type tools, 5 percent by mass was applied RELATIVE to the entire fibrous base material (the sheet 11 in Fig. 1). For the floor-type tools, 7.5 percent by mass of the antigenicity-reducing composition was applied relative to the entire fibrous base material (the sheet 31 in Fig. 4).

Evaluation Test

Evaluation Test 1: Evaluation of Antigenicity-Reducing

Performance

Antigenicity-reducing performance on cedar pollen and dust mites was evaluated for the fourth, fifth, and sixth embodiments and the second comparative example using the same procedure described above. The results are shown in Tables 6 and 7.

Table 6

Cedar Pollen Antigenicity Reduction Rate

Test example	Reduction rate	
	Hand-held	Floor
Comp. example 2	×	×
Embodiment 4	Δ	Δ
Embodiment 5	○	○
Embodiment 6	○	○

Table 7
Mite Antigenicity Reduction Rate

Test example	Reduction rate	
	Hand-held	Floor
Comp. example 2	×	×
Embodiment 4	×	Δ
Embodiment 5	○	○
Embodiment 6	○	○

Based on the results from Table 6 and Table 7, it was
 5 found that the floor-type cleaning tool of the fourth and
 sixth embodiments provided reductions of each of the
 antigenicity-reducing compositions. In the handy-type
 cleaning tool of the fifth embodiment, however, not as much
 of the antigenicity-reducing component was applied and the
 10 effect was somewhat less.

Evaluation Test 2: Evaluation of reductions after exposure
 to heat and light

Heating test: For the cleaning tools in the fifth and
 the sixth embodiment, the fibrous base material was covered,
 15 left indoors in the same procedure as described above, and
 subjected to the same Evaluation Test 2 described above.

Results are shown in Table 8, with the reduction rates
 and symbols in the table indicating the same as in Tables 6
 and 7. For both the cleaning tools of the fifth and the
 20 sixth embodiments, the reduction effect was maintained
 after exposure to heat for one month. The reduction effect
 was also maintained after exposure to sunlight.

Table 8
Mite Antigenicity Reduction Rate

Condition	Elapsed time	Embodiment 5		Embodiment 6	
		Hand-held	Floor	Hand-held	Floor
Immediately after application	0 days	○	○	○	○
RT	One month	○	○	○	○
40 deg C	One month	○	○	○	○
50 deg C	One month	○	○	○	○
Light exposure	One month equivalent	○	○	○	○
Light exposure	Six months equivalent	○	—	○	—

INDUSTRIAL APPLICABILITY

- 5 The present invention is suitable for use as an interior cleaning implement having a fibrous base material.

CLAIMS

1. A cleaning implement for interior cleaning comprising:
a fibrous base material; and
5 an antigenicity-reducing component for reducing
antigenicity of allergy-inducing substances.
2. The cleaning implement according to claim 1, wherein
said antigenicity-reducing component has been provided to
10 said fibrous base material as a solution into which said
antigenicity-reducing component is dissolved.
3. The cleaning implement according to claim 1 or 2,
wherein said antigenicity-reducing component is aqueous or
15 hydrophilic.
4. The cleaning implement according to one of claims 1 to
3, wherein said antigenicity-reducing component is a plant
extract component.
20
5. The cleaning implement according to one of claims 1 to
4, wherein said antigenicity-reducing component is an
extract from an olea or ligustrum plant extracted by using
water or an organic solvent.
25
6. The cleaning implement according to one of claims 1 to
5, wherein said antigenicity-reducing component is
oleuropein.
- 30 7. The cleaning implement according to claim 5 or 6,
wherein said fibrous base material is white.

8. The cleaning implement according to one of claims 1 to
7, wherein said antigenicity-reducing component is equal to
or more than 0.001 percent by mass and less than or equal
to 10 percent by mass relative to 100 parts by mass of said
5 fibrous material.

1/4

Fig. 1

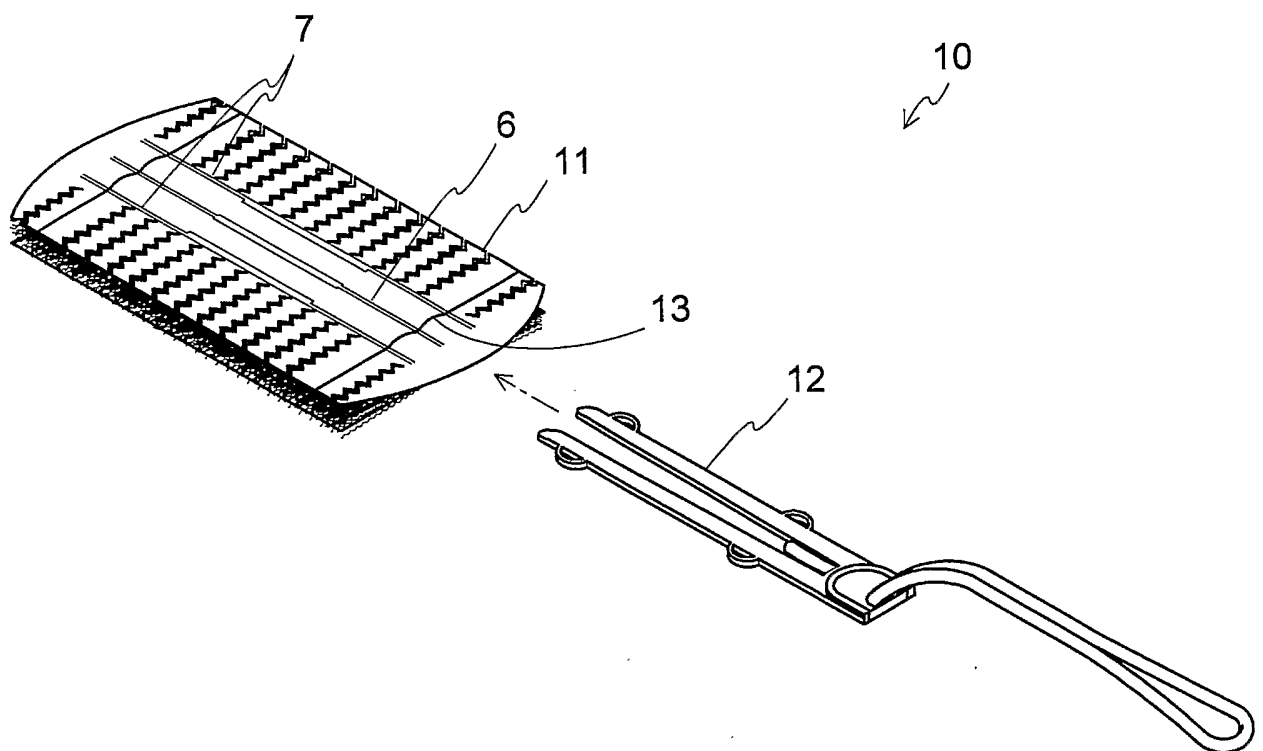
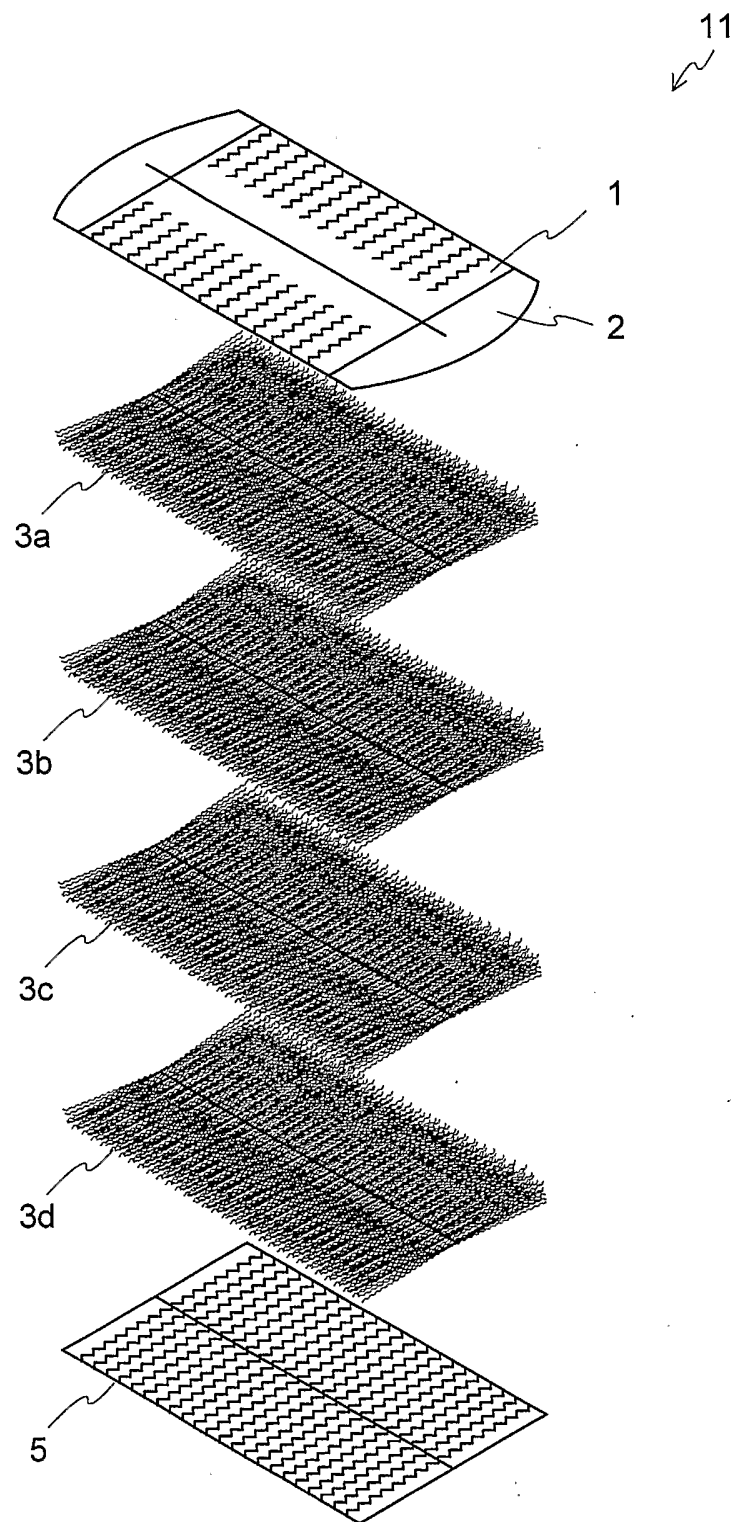
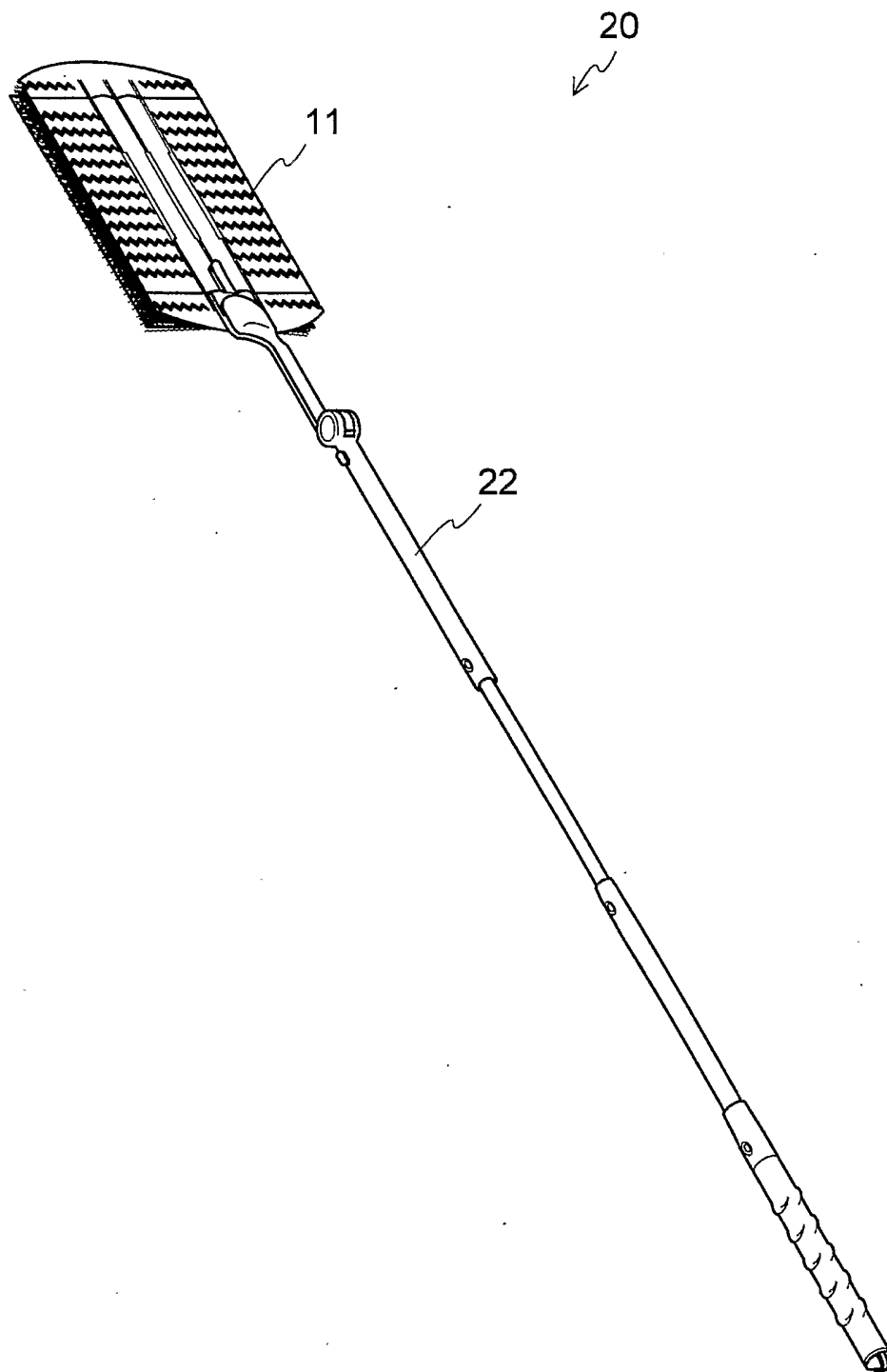


Fig. 2



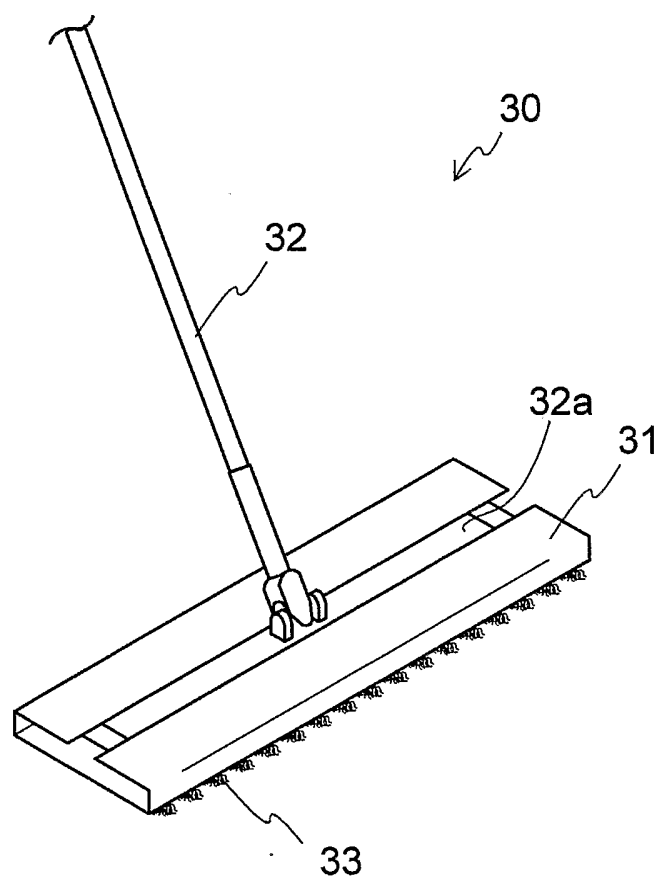
3/4

Fig. 3



4/4

Fig. 4



INTERNATIONAL SEARCH REPORT

International Application No

.../JP2005/016988

A. CLASSIFICATION OF SUBJECT MATTER C11D17/04 C11D3/382 A47L13/17 A47L13/20		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) C11D A47L		
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 practical, search terms used) EPO-Internal, WPI Data, PAJ		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/007251 A1 (KOENIG DAVID WILLIAM ET AL) 15 January 2004 (2004-01-15) paragraphs '0005!, '0006!, '0010!, '0015!, '0018! - '0020!, '0028!; claims 1-8,10,18-22,24,43-47,63-74,81-83; example 1	1-4,7,8
X	US 6 777 064 B1 (BROWN LAURA KREBS ET AL) 17 August 2004 (2004-08-17) column 1, lines 18-21 column 3, lines 29-63 column 5, lines 26-64 column 7, line 14 - column 8, line 8 column 18, line 42 - column 19, line 53 column 21, line 58 - column 22, line 9 claims; examples	1,2,7,8
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☒ Further documents are listed in the continuation of box C. ☒ Patent family members are listed in annex.		
* Special categories of cited documents : *A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family		
Date of the actual completion of the international search 9 December 2005		Date of mailing of the international search report 23/12/2005
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer Pentek, E

INTERNATIONAL SEARCH REPORT

International Application No

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