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(54) Title: CLEANING IMPLEMENT

(57) Abstract: An interior cleaning implement has a dry fibrous base material. An antigenicity-reducing composition that includes an antigenicity-reducing component and a lubricant 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.

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DESCRIPTION

CLEANING IMPLEMENT

TECHINICAL FIELD

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.

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. 2004-358952, filed December 10, 2004, the contents of which are incorporated herein by reference.

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 provoke these allergic diseases are referred to as allergens, of which approximately 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.

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 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).

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 (Japanese Patent Application Laid-open number 2003-334240, hereinafter called Patent Document 2).

With cleaning implement s such as dust cloths, mops, and wipers used to remove indoor dust and particles, 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.

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 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, the object must then be dried. Dry cleaning methods for reducing allergy-inducing substances have not been proposed. Furthermore, no research has been done on reducing antigenicity of allergy-inducing substances contained in

dust and particles collected on dry cleaning implements such as mops.

More specifically, with interior dry 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 dry 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.

Patent Document 1 does not take into account the adhesiveness or the permeability of the composition. Also, the allergen-reducing agent in the Patent Document 2 is meant to be used as an aqueous fluid, i.e., in a "wet" state, and is not easily applicable to a dry cleaning implement that contains essentially no moisture.

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 as a predetermined compound containing a lubricant, resulting in the present invention. More specifically, the present invention provides the following.

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

Since the cleaning implement uses an antigenicity-reducing composition containing an antigenicity-reducing component, the cleaning implement can reduce antigenicity of allergy-inducing substances attached on the cleaning implement. Also the antigenicity-reducing component and a lubricant can be applied easily to a "dry-type" fibrous base material. Furthermore, by applying less of each component, transfer from the fibrous base material to the object being cleaned can be prevented while in use.

In the present invention, "dry-type" cleaning implement refers to a cleaning implement containing the lubricant having a greater proportion by weight 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.

(2) The cleaning implement according to (1) has a fibrous base material including: a primary fibrous base material by applying the antigenicity-reducing component, and a secondary fibrous base material by applying the lubricant.

In these forms, the antigenicity-reducing component and the lubricant are provided for each fibrous base material, it is not necessary to mix each component in advance. Therefore, each component may be uniformly applied on the cleaning implement, even in a case in which an antigenicity-reducing component is not uniformly mixed with a lubricant.

(3) The cleaning implement according to (1) has a fibrous base material including: a primary fiber by applying the antigenicity-reducing component, and secondary fiber by applying the lubricant, in which these fibers are mixed.

In these forms, the antigenicity-reducing component is provided for each fiber, it is not necessary to mix each component in advance. Thus, each component is uniformly applied on the cleaning implement, even in a case in which an antigenicity-reducing component is not uniformly mixed with a lubricant.

(4) The cleaning implement according to one of (1) to (3) is one in which the antigenicity-reducing component is equal to or more than 0.001 parts by mass and less than or equal to 10 parts by mass relative to 100 parts by mass of the fibrous material, in which the lubricant is equal to or more than 0.001 parts by mass and less than or equal to 15 parts by mass relative to 100 parts by mass of the fibrous material.

By using these proportions, dust can be collected using the dust-adhesive capabilities of the fibrous base material itself as well as the lubricant. Furthermore, the antigenicity-reducing composition can reduce the antigenicity of allergy-inducing substances contained in the collected dust.

(5) The cleaning implement according to one of (1) to (4) is one in which the antigenicity-reducing component is aqueous or hydrophilic, and also, (6) the cleaning implement according to one of (1) to (5) is one in which the antigenicity-reducing component is a plant extract component.

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

(7) The cleaning implement according to one of (1) to (6) 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.

(8) The cleaning implement according to one of (1) to (7) 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.

(9) The cleaning implement according to (7) or (8) 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.

(10) The cleaning implement according to one of (1) to (9) is one in which the lubricant is a dust-adhesive lubricant, and also, (11) The cleaning implement according

to one of (1) to (10) is one in which the lubricant is a mineral oil.

By using a dust-adhesive lubricant or a mineral oil as the lubricant, and disengagement of the antigenicity-reducing composition 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 away once it is collected.

(12) The cleaning implement according to (11) is one in which a viscosity of the mineral oil is equal to or more than 10 and less than or equal to 200 mm^2/s at 30 degrees C.

It would be preferable for the viscosity of the mineral oil to be no less than 10 mm^2/s and no more than 200 mm^2/s at 30 degrees C, and more preferably no less than 15 mm^2/s and no more than 120 mm^2/s. If the viscosity is less than 10 mm^2/s, the composition may be transferred excessively to the object being cleaned and can adhere to hands, resulting in a sticky feeling. If the viscosity exceeds 200 mm^2/s, dust adhesion is reduced.

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 view showing an example of a cleaning tool according to the present invention.

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

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

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

BEST MODE FOR CARRYING OUT THE INVENTION

The antigenicity-reducing composition applied to the cleaning implement of the present invention includes: (a) an antigenicity-reducing component that reduces the antigenicity of allergy-inducing substances; and (b) a lubricant. The antigenicity-reducing component and the lubricant may be mixed together in advance, in the form of an antigenicity-reducing composition. Alternatively, the antigenicity-reducing component and the lubricant may be applied separately to each fiber bundle or to each fiber. These composition components will be described below.

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

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

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 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, a hydroxy benzoate such as 2,5-dihydroxy benzoate, or the 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 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 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 allergen protein.

The antigenicity-reducing components described above may be prepared as independent components provided on the cleaning implements, or prepared in a solution (hereinafter referred to as antigenicity-reducing agent) containing an active ingredient such as oleuropein, a fluid extract

thereof, and the like. The olive extract described above is an example of an antigenicity-reducing agent. It would also be possible to use the extract as the antigenicity-reducing agent containing ethanol and water besides oleuropein.

Lubricant

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 lubricant, but it would be preferable to include at least 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.

Of these, using liquid paraffin as the main component of the lubricant is preferable since the antigenicity component and the lubricant applied once on fibrous base material, is prevented from disengaging and getting caught in the object being cleaned.

Other Components

Components other than the antigenicity-reducing component and the lubricant 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 may be applied in manufacturing steps for manufacturing the antigenicity-reducing composition, and also may be applied to a cleaning implement separately from the antigenicity component and the lubricant.

Examples of the components other than the antigenicity-reducing component or the lubricants are surfactants. The "surfactant" used in the present invention is added to allow easy application of the

antigenicity-reducing component and the lubricant to the cleaning implement and to make the application uniform. It would be preferable to use a nonionic activator. With the nonionic activator, the antigenicity-reducing component can be mixed with the lubricant in a stable manner.

There are no special restrictions on the nonionic surfactants, but examples of preferable polyoxyethylene 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 stearic acid; and sorbitan monoester of oleic acid. Examples of preferable glycerine fatty acid esters include: glyceryl mono myristate; glyceryl mono stearate; glyceryl mono oleate; glyceryl mono isostearate; and glyceryl di oleate. Examples of preferable vegetable oils 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 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.

Preparation of Antigenicity-Reducing Composition

The components described above are mixed/agitated using conventional known methods to form an antigenicity-reducing composition. The proportions relative to the overall antigenicity-reducing composition of the two necessary components, the antigenicity-reducing component,

and the lubricant, are preferably no less than 0.01 percent by mass and no more than 50 percent by mass of the antigenicity-reducing component; and no less than 50 percent by mass and no more than 99 percent by mass of the lubricant. More preferably, no less than 0.02 percent by mass and no more than 10 percent by mass of the antigenicity-reducing component; and no less than 60 and no more than 95 percent by mass of the lubricant.

Using 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 50 percent by mass results in instability over time in the antigenicity-reducing composition and also increases cost.

Using less than 50 percent by mass of the lubricant is not preferable since the lubricant provides inadequate improvement in the adhesion of dust and the like. A proportion greater than 99 percent by mass of the lubricant results in instability over time in the antigenicity-reducing composition and is therefore not preferable.

When an antigenicity-reducing composition containing the antigenicity-reducing component, the lubricant, and a surfactant is applied to the cleaning implement, 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 composition containing the antigenicity-reducing component, the lubricant, and the surfactant is applied to the cleaning implement, 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.

In the case in which the antigenicity-reducing composition containing the antigenicity-reducing component, the lubricant, and the surfactant is applied to the cleaning implement, 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-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 is therefore not preferable.

In the case in which the antigenicity-reducing composition containing the antigenicity-reducing component, the lubricant, and a surfactant is applied to the cleaning implement, 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 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 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 material, transfer of the antigenicity-reducing composition to the object being cleaned due to excessive adhesion of the antigenicity-reducing composition can be prevented.

Cleaning Implement

Next, a cleaning implement to which the above antigenicity-reducing composition is applied will be described. There are no special restrictions on the cleaning implement as long as it is a "dry-type" cleaning implement, i.e., an interior cleaning implement having a fibrous base material that contains essentially no water. 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 base 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.

Examples of Cleaning Tools

Fig. 1 and Fig. 2 show an example of this type of cleaning tool. Fig. 1 is an exploded view of a cleaning tool. Fig. 2 is an exploded perspective view 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 is 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 composition to the entire cleaning sheet 31.

Application to a Cleaning Implement

Examples of methods for applying the antigenicity-reducing composition to the cleaning implement described above include spraying or roller-coating the antigenicity-reducing composition onto the fibrous base material, immersion, and the like, but the present invention is not restricted to these methods.

In a "handy-type" cleaning tool as shown in Fig. 1, it would be preferable to apply the antigenicity-reducing composition at no less than 0.001 and no more than 10% by mass relative to the entire fibrous base material. Applying 0.001% by mass or less will not allow dust particles to be completely picked up. At 10% by mass or more, the composition is transferred excessively to the object being cleaned and also is transferred to the hands, resulting in a sensation of stickiness. In floor-type cleaning tools as shown in Fig. 4, however, it would be preferable to apply slightly more composition, of from 3 to 15% by mass relative to the entire fibrous base material, and it would be more preferable to apply from 0.01 to 15% by mass. Applying 0.01% by mass or less will not allow dust particles to be completely picked up. At 15% by mass or more, the composition is transferred excessively to the object being cleaned and is also transferred to the hands, resulting in a sensation of stickiness. Thus, the ratio of antigenicity-reducing component should be no less than 0.001 and no more than 10 percent by mass, and effects can be obtained by minute amounts of antigenicity-reducing component.

In addition, the antigenicity-reducing component may be applied separately from the lubricant. In this case, the antigenicity-reducing component and the lubricant can be applied at each manufacturing step containing a fiber production step and a cleaning implement production step. For example, steps comprising: (i) fiber production step, in which application method for producing fiber by compounding fiber lubricant (surfactant, etc.) with antigenic reducing component, applied with lubricant after drying; (ii) fiber production step, in which application method for producing fiber by compounding fiber lubricant

(surfactant, etc.) with antigenic reducing component, applied with lubricant, in a cleaning implement production step; and (iii) a cleaning implement production step, in which antigenic reducing component is produced, and lubricant is applied thereafter; are possible.

In addition, the antigenicity-reducing component can be applied to each fiber bundle, or to each fiber at the cleaning implement production step. In the case in which the antigeneicity-reducing component is applied to each fiber bundle, a cleaning implement is produced by a production method described above, after applying the antigenic reducing component on the first fiber bundle 3a, the lubricant on the second and the third fiber bundles 3b and 3c, and the antigenic reducing component on the fourth fiber bundle 3d, referring to the cleaning implement shown in Fig. 2, for example.

When applying the antigenic reducing component on each fiber, first fibers containing antigenic reducing component and second fibers containing lubricant are combined, to form a fiber bundle. Thereafter, a cleaning implement is produced using this fiber bundle.

The application method for applying the antigenic-reducing component and the lubricant, performed by spraying and roller coating, and dipping, are similarly possible as methods for applying antigenic reducing compound, although the method is not limited thereto. However, in the case in which the antigenic-reducing component are separately applied, from the lubricant, it is preferable that the amount applied fall in the same range as in the case of applying the antigenic reducing composition.

When the antigenicity-reducing composition containing the antigenicity-reducing component, the lubricant, and the surfactant is applied 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.

When the antigenicity-reducing composition containing the antigenicity-reducing component, the lubricant, and the surfactant is applied for 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 implement 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 retrieved by the cleaning tool. 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.

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.

First to Third Embodiments and First Comparative Example

Making Antigenicity-Reducing Agents Containing Antigenicity-Reducing Components

Olive Extract

Extraction was performed on the leaves of the olive 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.

Solution Having Tannic Acid

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

Production of the Antigenicity-Reducing Composition

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

Table 1

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

Name	Test Example	Liquid Paraffin Note 2)	Antigenicity-Reducing Component Note 1)
Standard Lubricant	Solution Example 4	100	-
Solution Having Tannic Acid	Solution Example 1	99	1
	Solution Example 2	90	10
Olive Extract	Solution Example 3	90	10

Note 1) (Solution having tannic acid): Tannic acid (Wako Pure Chemical Industries, Ltd.) was dissolved in water and ethanol so as to be adjusted to 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) 50 mm^2/s viscosity at 30 degrees C.

Application of the Antigenicity-Reducing Composition to the Cleaning Tool

Next, the antigenicity-reducing composition solution examples 1 through 3 and the composition 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 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 first, second, and third 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 x (allergen volume from a cleaning tool to which antigenicity-reducing agent was applied quantified using the ELISA method) / (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)

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 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 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 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

Cedar Pollen Antigenicity Reduction Rate

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

Table 3

Mite Antigenicity Reduction Rate

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

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 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	o	o	o	o
RT	One month	o	o	o	o
40 deg C	One month	o	o	o	o
50 deg C	One month	o	o	o	o
Light exposure	One month equivalent	o	o	o	o
Light exposure	Six months equivalent	o	-	o	-

Fourth to Sixth Embodiments and Second Comparative Example

Antigenicity-reducing components contained in antigenicity-reducing compositions were applied to fibrous 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 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 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 and agitated to prepare the antigenicity-reducing composition.

Table 5

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

Name	Test example	Poly oxy ethylene alkyl ether Note 2)	Sorbitan oleic acid mono ester	Liquid paraffin Note 3)	Water	Anti genicity-educing component Note 1)	Glyceryl mono iso staearate	Safflower oil	Sorbitan oleic acid triester	Poly oxy ethylene hydro genated castor oil Note 4)	Poly oxy ethylene alkyl ether 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 mm^2/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

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

Table 7
Mite Antigenicity Reduction Rate

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

Based on the results from Table 6 and Table 7, it was 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 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, 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 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

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

INDUSTRIAL APPLICABILITY

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 dry fibrous base material;
an antigenicity-reducing component for reducing antigenicity of allergy-inducing substances; and
a lubricant.

2. The cleaning implement according to claim 1, said fibrous base material comprising:
a primary fibrous base material by applying said antigenicity-reducing component, and a secondary fibrous base material by applying said lubricant.

3. The cleaning implement according to claim 1, said fibrous base material comprising: a primary fiber by applying said antigenicity-reducing component, and secondary fiber by applying said lubricant, wherein these fibers are combined.

4. The cleaning implement according to one of claims 1 to 3, wherein said antigenicity-reducing component is equal to or more than 0.001 parts by mass and less than or equal to 10 parts by mass relative to 100 parts by mass of said fibrous material, wherein said lubricant, is equal to or more than 0.001 parts by mass and less than or equal to 15 parts by mass relative to 100 parts by mass of said fibrous material.

5. The cleaning implement according to one of claims 1 to 4, wherein said antigenicity-reducing component is aqueous or hydrophilic.

6. The cleaning implement according to one of claims 1 to 5, wherein said antigenicity-reducing component is a plant extract component.

7. The cleaning implement according to one of claims 1 to 6, wherein said antigenicity-reducing component is an extract from an Olea or Ligustrum plant extracted by using water or an organic solvent.

8. The cleaning implement according to one of claims 1 to 7, wherein said antigenicity-reducing component is oleuropein.

9. The cleaning implement according to claim 7 or 8, wherein said fibrous base material is white.

10. The cleaning implement according to one of claims 1 to 9, wherein said lubricant is a dust-adhesive lubricant.

11. The cleaning implement according to one of claims 1 to 10, wherein said lubricant is a mineral oil.

12. The cleaning implement according to claim 11, wherein a viscosity of said mineral oil is equal to or more than 10 and less than or equal to 200 mm^2/s at 30 degrees C.

Fig. 1

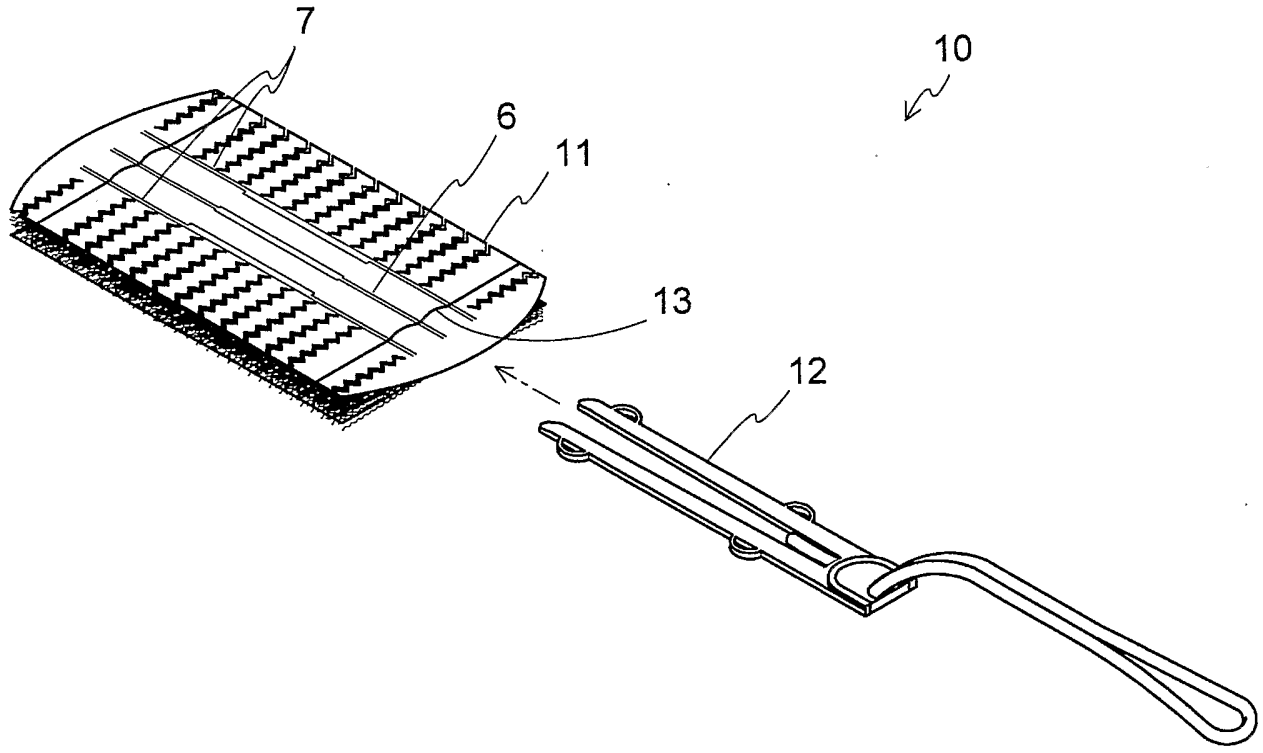


Fig. 2

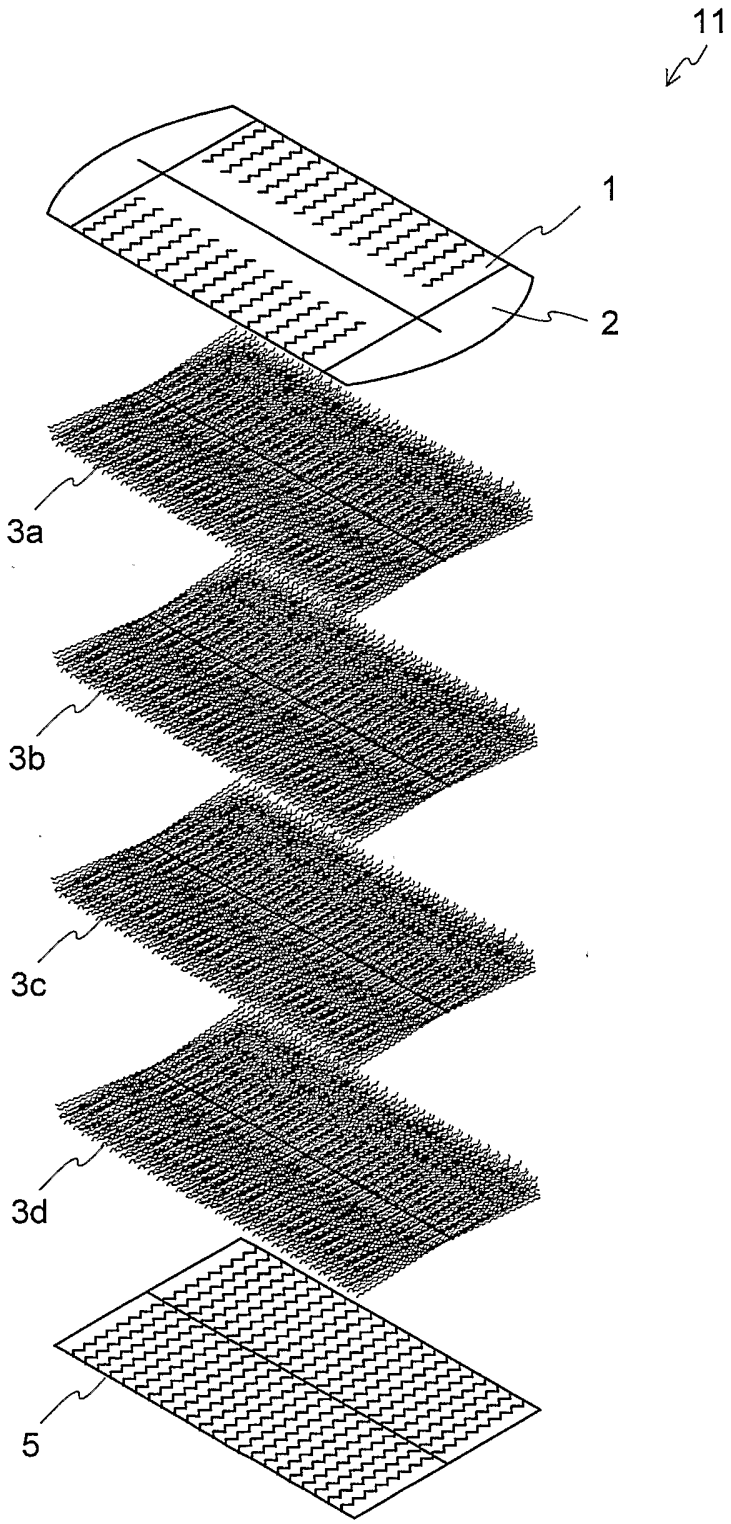


Fig. 3

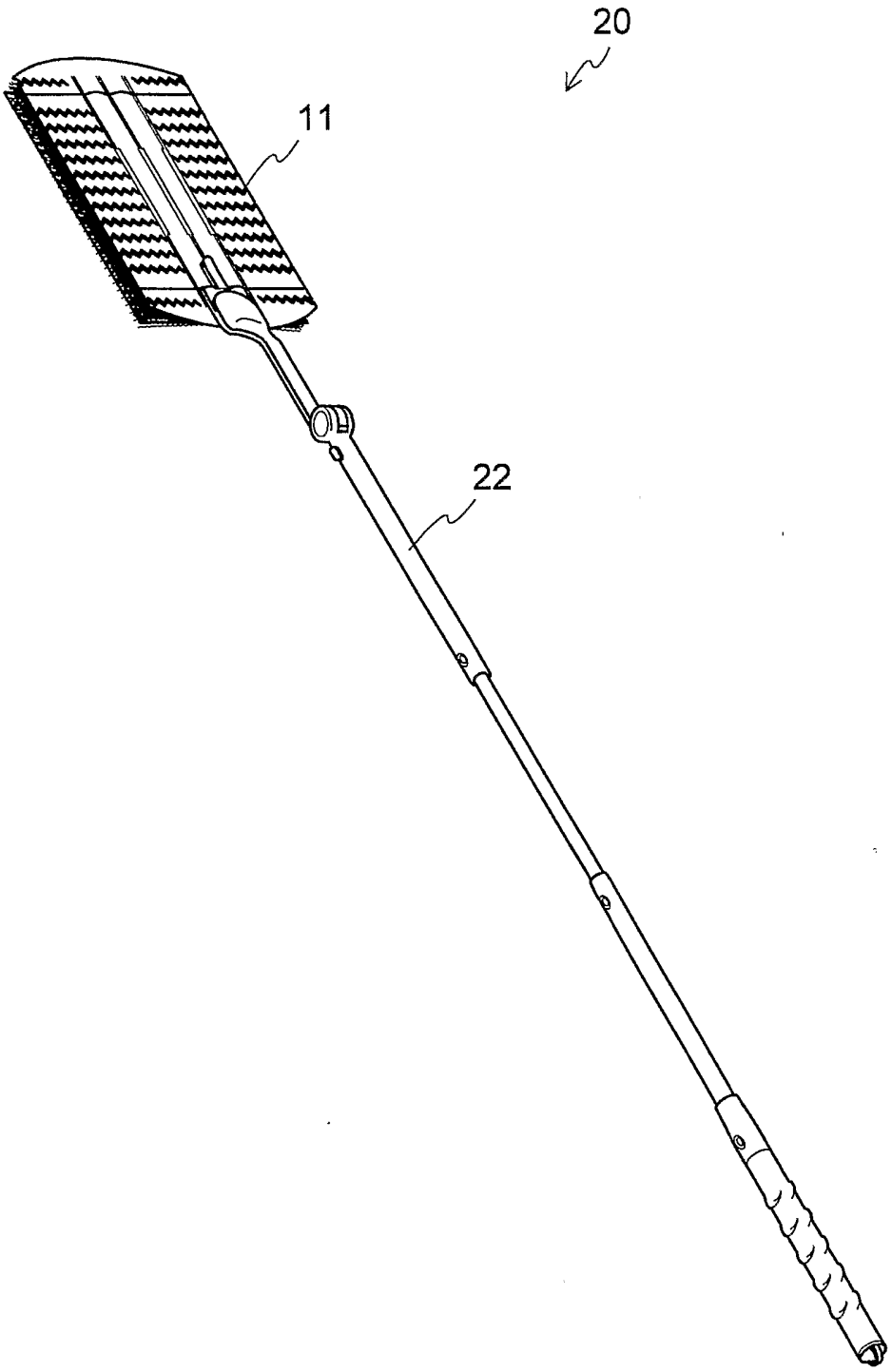
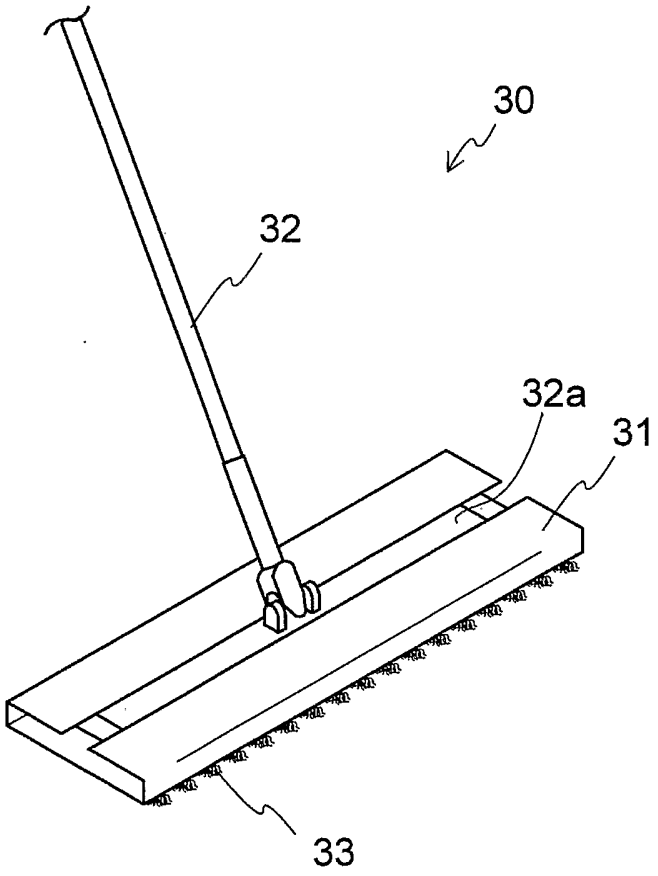


Fig. 4



INTERNATIONAL SEARCH REPORT

Int nal Application No
PCT/JP2005/016997

A. CLASSIFICATION OF SUBJECT MATTER
C11D17/04 C11D3/382 C11D3/18 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.
Y	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	1-6,9-12
X,Y	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	1-6,9-12

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
9 December 2005	22/12/2005

Name and mailing address of the ISA	Authorized officer
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	Pentek, E

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INTERNATIONAL SEARCH REPORT

Inter nal Application No
PC I7 JP2005/016997

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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X	WO 00/61107 A (THE PROCTER & GAMBLE COMPANY) 19 October 2000 (2000-10-19) page 1, lines 14-18 page 4, lines 5-17 page 6, line 1 - page 7, line 7 page 11, lines 3-24 page 17, lines 17-24 page 20, line 32 - page 21, line 8 examples	1-6,9-12
X	US 2003/032352 A1 (CHANG YIHUA ET AL) 13 February 2003 (2003-02-13) paragraphs '0104!, '0111! - '0116!, '0120!, '0134!, '0136! - '0149!; claims 25,26	1-6,9-12

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Information on patent family members

International Application No
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