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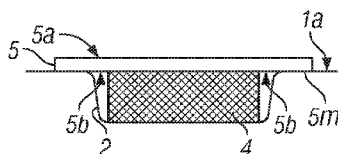


FIG. 2

(57) Abstract: Disclosed is fragrancing system comprising a fragrance substrate in fluid communication with a porous reservoir containing a quantity of an air treatment composition. The fragrancing system provides good perceived delivery of an air treatment composition over a timespan of several weeks.

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**FRAGRANCING SYSTEM COMPRISING FRAGRANCE SUBSTRATE AND
POROUS RESERVOIR**

The present invention relates to a fragrancing system. More specifically, the
10 present invention relates to a fragrancing system comprising a fragrance substrate in fluid
communication with a porous reservoir containing a quantity of an air treatment
composition.

It is highly desirable in many consumer as well as in institutional applications to
provide a device which includes a fragrancing or other air treatment feature. Such can for
15 example be an air treatment device whose primary technical purpose is to provide a
volatile material to an ambient air space. Alternately, such can be a device which
provides a different primary technical functions such as a cleaning a function, and which
as a secondary technical function provides such a fragrancing or other air treatment
feature. For example, contemplated are devices which include a liquid contained within a
20 reservoir wherein said liquid may optionally include in a fragrance but which is
substantially directed to providing a cleaning or disinfecting benefit to a substrate and/or
article, namely respectively, a lavatory appliance such as a toilet, or to a hard surface,
wherein said device also includes one or more elements or portions thereof which provide
a fragrancing (or other air treatment) benefit to the ambient environment surrounding the
25 device, which may be provided either independently of, or in conjunction with the
primary technical benefit of the device.

Various fragrance substrates are long known to the art, however these are not
without shortcomings. For example, is known to impregnate a fibrous carrier or web
such as a felt pad with a quantity of an air treatment composition, e.g. a fragrance or other
30 volatile material. Exposure of the impregnated fibrous carrier or web to the ambient
environment permits for the release of and volatilization of the fragrance or other volatile
material into the ambient environment. However, such impregnated fibrous carriers or
webs are typically not long lasting and usually suffer a very short useful service life

particularly when used in a high humidity and/or high temperature ambient environments.

A further known fragrance substrate is a vessel containing a quantity of a liquid air treatment composition and one or more wicks which at one end are immersed within the quantity of the liquid air treatment composition, and another end or part of the same wick is exposed to the ambient environment. Such are advantageous in providing a usefully long service life typically on the order of several weeks and possibly even months depending upon the ambient environment and operating conditions within which such a device is used. However, the production and use of such a vessel containing the liquid composition in the wick typically requires careful consideration of providing appropriate physical liquid seals to ensure that inadvertent tipping over of the vessel, or inadvertent contact of the saturated exposed end or exposed parts of the wick do not prematurely release the liquid air treatment composition. Such are highly undesirable particularly as many known liquid air treatment compositions are usually oils and are prone to leave permanent stains particularly on textiles or other fibrous substrates.

A still further known and popular fragrance substrate is in the form of a gel body or mass which contains a quantity of a volatile air treatment composition contained therein. However such a gel body or mass is not without attendant shortcomings. Frequently, the nature of the carrier matrix used to form the gel provides only a limited possible concentration of the air treatment composition which can be contained within the gel body or mass. Additionally, any such carrier matrix needs to be chemically compatible with the air treatment composition, e.g., fragrance, in order to ensure that a sufficiently strong gel body or gel mass is formed. Further, often such a gel body or mass becomes relatively unattractive as the volatile air treatment composition contained therein is released to the atmosphere; shrinkage and deformation of the gel body or mass often occurs and is very unattractive from a consumer perspective.

Thus, it is amongst the objects of the invention to provide a fragrance substrate which overcomes one or more of the technical shortcomings known to the art.

Accordingly, in a first aspect of the invention there is provided as a fragrancing system, a fragrance substrate which is in fluid communication with a porous reservoir containing a quantity of a liquid, or in contact with a gel, of an air treatment composition, which porous reservoir operates as a supply source for the fragrance substrate.

In a second aspect of the invention is provided an improved method for delivering an air treatment composition to an ambient environment, which method contemplates the use of the fragrancing system according to the first aspect of the invention.

5 In a third aspect of the invention is provided a method for the manufacture of the fragrancing system described with respect to the first aspect of the invention.

In a fourth aspect of the invention is provided an article which comprises the fragrancing system according to the first aspect of the invention.

These and further aspects and advantages of the invention will be apparent from a review of the present patent specification.

10 Fig. 1 depicts a first preferred embodiment of a fragrancing system.

Fig. 2 depicts a cross-sectional view of the embodiment of Fig. 1.

Fig. 3 depicts a second preferred embodiment of a fragrancing system.

Fig. 4 depicts a cross-sectional view of the embodiment of Fig. 2.

Fig. 5 illustrates a cross-sectional view of a third embodiment of the invention.

15 The present invention provides a fragrancing system comprising a fragrance substrate which is in fluid communication with a porous reservoir containing a quantity of a liquid, or in contact with a gel, of an air treatment composition, which porous reservoir operates as a supply source for the fragrance substrate. The air treatment composition may essentially be any material, especially liquid, which is capable of being
20 volatilized from the fragrancing system and into an ambient environment of the fragrancing system. The porous reservoir entrains a quantity of a liquid, gel or other air treatment composition, and releases it to the fragrance substrate via fluid communication. Advantageously the porous reservoir comprises or preferably consists of a quantity or mass of a porous material, e.g., fibrous substrate such as paper, or a fibrous pad, or a
25 sponge such as of an open celled or closed celled hydrophobic polymer, or a ceramic article or mass, or polymer article or mass which entrains a quantity of the air treatment composition. Advantageously the relative porosity of the porous material used as the porous reservoir is great than that of the fragrance substrate. The fragrance substrate itself is a porous polymer which provides for both the retention of, as well as the delivery
30 into the ambient environment from, an air treatment composition from within said material. Such delivery may be by any means, e.g., volatilization or evaporation of the

air treatment composition into the ambient environment. Thus, the fragrance substrate permits for the diffusion of an air treatment composition, typically in liquid form, from within the interior of the fragrance substrate to pass to exposed surfaces, which are advantageously planar surfaces, of the fragrance substrate and to be delivered into the ambient environment from said surfaces. At the same time, such delivery of the air treatment composition causes a negative diffusion or capillary gradient within or across the fragrance substrate, thereby inducing a further quantity of the air treatment composition contained within the interior of the fragrancing device to move such as by migration, e.g., capillary flow or diffusive migration to one or more surfaces of the porous fragrance substrate exposed to the ambient environment and to thereby emit or deliver the air treatment composition to the ambient environment. As the air treatment composition is delivered, the reduction of the mass of the air treatment composition within the fragrance substrate also induces the flow of air treatment composition contained within the porous reservoir to pass to, and to replenish the fragrance substrate. In such a manner, a long service life can be provided by the fragrancing system, typically far longer than the service life that would otherwise be provided by the fragrance substrate absent the porous reservoir containing air treatment composition.

In preferred embodiments the fragrance substrates are preferably made from or include one or more porous polymer materials which incorporate one or more inorganic materials, particularly one or inorganic materials in particulate form, such as silica and/or carbon, e.g. in powder form. Nonlimiting examples of suitable polymer materials include, but are not limited to polyamides, polyolefins (e.g., polypropylene, polyethylene) as well as polyalkyleneterephthalates (i.e., polyethylene terephthalate, polybutylene terephthalate), polystyrenes, polysulfones, polycarbonates as well as copolymers formed from monomers of one or more of the foregoing synthetic polymers. Other naturally occurring or synthetic polymers but it will also be used although not specifically described herein, it is only required that the selected polymer or copolymer be fabricable into a fragrance substrate as described herein. Of these, polyolefins are particularly preferred.

The one or more inorganic materials of the porous polymer materials are present in particulate form, such as silica and/or carbon which are preferably provided in a

comminuted, i.e., powder form. These inorganic materials may be mixed into, or compounded into the polymer material. Advantageously, the inorganic materials are generally uniformly dispersed within the porous polymer material such that they are present at a relatively homogenous concentration within the bulk of the porous polymer material used to form the fragrance substrates. The size of the inorganic materials is usually expressed in terms of average particle size, and generally average particle sizes on the order of from about 0.001 microns to about 1000 microns, preferably from about 10 microns to about 500 microns may be used. Of course, depending upon the nature of the specific fragrance substrate desired to be produced, and/or the chemical nature of the air treatment material to be contained within said fragrance substrate, and/or the desired release rates of the air treatment material contained within the said fragrance substrate, a specific average particle size or range of average particle sizes within, or even outside of, the above specified ranges may be utilized. The proportion of the inorganic materials present within the porous polymer material may vary significantly, and typically comprises between 5 – 95%wt, preferably 10-90%wt., more preferably between 25-80%wt. and still more preferably between 40-70%wt. of the mass of the fragrance substrate, prior to the addition of or incorporation into, of any air treatment composition thereto.

The porous polymer materials used as the fragrance substrate may also include one or more further additive constituents thereto in effective amounts. By way of nonlimiting example these include one or more of: fillers, plasticizers, antioxidants, lubricants, antistatic agents, pigments, dyes, stabilizers, light stabilizers, and the like.

By way of non-limiting example, suitable porous polymer materials useful for fragrance substrates include those described in US Patent 3351495, and US Patent 6139795 the contents of which are herein incorporated by reference. Further non-limiting examples of suitable polymer materials are disclosed in WO 03/086490 A1. Particularly preferred porous polymer materials for use in the fragrance substrate are those currently marketed as “DARAMIC polyethylene battery separator material”, which is described to be a porous filled polymer comprising 54-67%wt. of an amorphous silica, 2 – 22%wt. of an oil, and 20-26%wt. of a polyethylene polymer, which is currently commercially available from Daramic LLC (Owensboro, Kentucky, USA).

The thickness of the fragrance substrate, is preferably on the order of between 0.01 mm and 10 mm, more preferably between 0.05 – 5 mm, still more preferably between 0.1 - 3 mm, yet more preferably between 0.1 – 2 mm. The fragrance substrate may be formed of a single piece or layer of material, or may be formed by lamination of two or more materials, one of which is necessarily the fragrance substrate capable of containing and releasing an air treatment composition therefrom. It is contemplated that a laminated form of a fragrance substrate may be formed of two or more layers each of which are materials which are capable of containing and releasing an air treatment composition therefrom, although only one of which need be formed of the porous polymer material, and the remaining layer(s) may be of a different material which may also function as the porous reservoir. Alternately, is contemplated that a laminated form of a fragrance substrate can be formed of two or more layers, at least one of which are materials which are capable of containing and releasing an air treatment composition therefrom, with a least one further layer which does not provide such a function, i.e., can be a barrier layer such as an impervious foil layer, metallized plastic layer, or any other material which retards or denies absorption off the air treatment material within. In the case of the latter, such a barrier layer may be removed by a user or consumer of the fragrancing system prior to its use in order to initiate its operation.

The fragrance substrate is advantageously and most preferably a porous polymer material containing one or inorganic materials in particulate form as described above. The porous material may absorb and/or adsorb the air treatment composition, which is desirably provided as a fluid or liquid, e.g., a fragrancing oil, in a relatively high weight proportion relative to the weight (mass) of the porous polymer itself. Advantageously the weight (mass) ratio of the porous polymer material of the fragrance substrate can absorb or adsorb fluid or liquid in amounts of 1:0.75 – 2.5; preferably 1:0.8 – 2, and still more preferably 1:1 – 1.6 on a weight:weight basis.

The fragrancing system of the invention further includes a porous reservoir which operates as the supply source for the fragrance substrate. The porous reservoir entrains a quantity of the air treatment composition which is used to supply the fragrance substrate during use of the fragrancing system. The porous reservoir is not a liquid, but is advantageously a porous material, e.g., one or more of a fibrous substrate such as paper,

or a fibrous pad, or a sponge such as of an open celled or closed celled hydrophobic polymer, or porous ceramic mass or article, or a porous polymer mass or article, each of which may entrain a quantity of the air treatment composition. Advantageously the relative porosity of the material used as the porous reservoir is greater than that of the fragrance substrate.

One class of porous materials are fibrous substrates, e.g., paper, and fibrous substrates, such as fibrous cellulosic webs. Such fibrous cellulosic webs may comprise wetlaid webs, airlaid webs, coform webs, hydroentangled webs, bonded carded webs, or mixtures thereof. Fibrous substrates based on materials other than cellulose, e.g., synthetic polymer fibers are also contemplated to be useful including meltblown and melt spun synthetic polymer fibers. Blends of different fibers, including blends of cellulose and non-cellulosic materials may also be used to form useful fibrous substrates. For example, a hydroentangled web that comprises a spunbond web that has been hydroentangled with cellulose fibers also illustrates a further useful embodiment of a fibrous substrate. A fibrous substrate useful in or as the porous reservoir includes a fiber or strand, either singular or woven, twisted, braided, bundled, molded or shaped in a manner that transports fluid or vapors by capillary action or that can retain the air treatment composition.

A further class of porous materials are foams and sponges, such as open celled or closed celled sponges which may be based on naturally occurring or synthetically produced polymers, e.g., hydrophobic polymer sponges such as based on one or more polyolefins, e.g., polyurethane, as well as hydrophilic polymer foams, e.g. those based on regenerated cellulose, as well as natural sponges. The specific type of sponge should be selected to be compatible with the type of air treatment material with which it will be used.

A still further class of porous materials useful in the porous reservoir of the invention include a porous ceramic mass or article, which may be a sintered. Non-limiting examples include ceramic materials like alumina, or silica as well as blends of one or more with further materials which optionally may be sintered to form porous materials, and which may be used to entrain the air treatment composition. The ceramic mass may be a plurality of particles, such a free flowing prills, powders or compacted

particles, e.g., compressed forms, or the porous ceramic mass may be a monolithic shaped or formed ceramic article, e.g. by compression in conjunction with a binder material, or by sintering.

5 A yet further class of porous materials include polymers in either particulate form or in the form of a monolithic shaped article. Non-limiting examples of such porous polymers include polytetrafluoroethylene, polycarbonates, polymethylmethacrylate, polyalkylene terephthalates and polyolefins. Such a polymer mass may be a plurality of particles, such a free flowing prills, powders or compacted particles, e.g., compressed forms, or the polymer may be a monolithic shaped or formed ceramic article, as opposed
10 to the use of polymer fibers.

The porous reservoir may also comprise further absorbent particles or materials, including superabsorbent particles present within the porous reservoir.

The porous reservoir may be formed from a single type of porous material, or may include a plurality of porous materials such as in a multi-layered form. Such a
15 multi-layered form contemplates both blends of two or more differing types of porous materials, as well as porous materials which further comprise one or more absorbent or superabsorbent particles, as well as multi-part configurations such as multilayer or laminated constructions of two or more sheets, webs, or pieces of porous materials which are combined, e.g. layered in register, to ultimately provide the porous reservoir of the
20 fragrancng system.

The porous reservoir may also be formed from a material suitable for use the fragrance substrate with the proviso that its fluid transport characteristics differ from those of the fragrance substrate.

25 In preferred embodiments the porous reservoir is a fibrous substrate, as such is effective, easily filled with an air treatment composition, and is inexpensive.

In preferred embodiments, at least about 85%, preferably at least about 90%, more preferably at least about 95% and especially preferably about 100% of the air treatment composition present is contained within the fragrance substrate or porous substrate or both, leaving little or no liquid air treatment composition physically exterior
30 of the fragrance substrate or porous substrate or both. Thus, essentially all, preferably, all of the air treatment composition used in the fragrancng systems is entrained, absorbed or

adsorbed in the fragrance substrate, porous substrate or both and is not available as a free flowing liquid exterior of the fragrancing system.

Advantageously, the porous reservoir exhibits a lower affinity to the air treatment composition which it contains as compared to the fragrance substrate, which exhibits a relatively higher affinity. Alternately stated, the air treatment composition is more easily delivered to an ambient environment at room temperature from material used to form the porous substrate, or from the porous substrate itself, than from the fragrance substrate, which provides for a slower release or delivery of the air treatment composition to the ambient environment. It can thus be understood that with respect to the rate of volatilization of the air treatment material from a fragrance substrate is lesser than from a similarly dimensioned porous reservoir on a unit time basis. Such properties allows for the relatively faster mass transfer of air treatment composition between the fragrance substrate and the air treatment material, than the mass transfer, or delivery to the air in an ambient environment e.g, by volatilization or evaporation, of the air treatment composition. Thus, the nature of and selection of the material used to form the fragrance substrate has a controlling effect on the rate of delivery of the air treatment composition to an ambient environment particularly when the porous reservoir is contained in a recess, receptacle or article which is covered by the fragrance substrate and/or wherein the porous substrate is contained within or between fragrance substrates.

The dimensions of the porous reservoir relative to that of the fragrance substrate may vary widely and may be adapted to suit any desired form. It is only required that the porous reservoir be in fluid communication with the fragrance substrate so to permit the flow of air treatment composition contained within the porous reservoir to flow to the fragrance substrate from whence the air treatment composition is ultimately delivered to an ambient environment, e.g., by volatilization or evaporation.

Desirably the fragrance substrate is generally planar or has at least one planar surface which is exposed to the ambient environment; such provides for a surface area which is particularly useful in delivering the air treatment composition. More desirably the fragrance substrate is generally planar, and has two parallel surfaces or sides on opposing faces, e.g., in a sheet like form. In preferred embodiments the fragrance substrate is generally planar and has two parallel surfaces with opposing faces, one face

which is exposed to the ambient environment, the other face having an area at least a part of which is in physical contact with the porous reservoir; preferably the former face never contacts the porous reservoir when the fragrancing system operates. Such physical contact provides for an area of interfacial contact via and provides a route of fluid communication between the porous reservoir and the fragrance substrate occurs.

5 Preferably the area of physical contact between a face of the porous reservoir and the face of the fragrance substrate can be as little as about 1%, but preferably is at least about 5%, and in order of increasing preference is at least about 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45%, 50%, 55%, 60%, 65%, 70%, 75%, 80%, 85%, 90% and especially preferably
10 at least about 95% of the area of a face of the fragrance substrate. In certain preferred embodiments at least about 98%, preferably about 99% and especially preferably about 100% of a face of a porous reservoir and a face of the fragrance substrate are in interfacial contact, viz., are layered "in register" or are laminated.

In an especially preferred embodiment, the porous reservoir has a contacting face
15 which is laminated to or in interfacial contact with one face of a fragrance substrate having two parallel surface with opposing faces, while the other face is not in contact with the porous reservoir but is exposed to the ambient environment of the fragrancing system.

In a further especially preferred environment, the fragrancing system forms part
20 of an article having a recess said recess having an opening, wherein the porous reservoir comprising an air treatment composition is present within the recess, the porous reservoir has a contacting face which is laminated to or in interfacial contact with one face of a fragrance substrate having two parallel surface with opposing faces, while the other, exposed face is not in contact with the porous reservoir but is exposed to the ambient
25 environment of the fragrancing system and of the article, and preferably wherein the fragrance substrate spans the opening of the recess, and especially preferably isolates the interior of the recess, and the porous reservoir, from the ambient environment. Desirably the material of the article of which at least the recess is formed provides effective barrier properties to inhibit the flow or release of the air treatment composition, other than via
30 the fragrance substrate.

It is also contemplated that two or more different porous reservoirs containing different air treatment compositions may be present, and in fluid communication with a fragrance substrate, such as in physical interfacial contact therewith. In such an embodiment two or more air treatment compositions may be delivered from one
5 fragrance substrate.

It is also contemplated that a fragrancing system may comprise two separate fragrance substrates having laminated therebetween, or otherwise containing therebetween a porous reservoir comprising an air treatment composition. In one form of such an embodiment, a first fragrance substrate having two parallel surfaces with
10 opposing faces is layered in register with a porous reservoir preferably also having parallel surfaces with opposing faces such that a first face of the porous reservoir is in interfacial contact with a part of the first fragrance substrate, and in turn a second fragrance substrate having two parallel surfaces with opposing faces is layered in register with a the second, opposite face of the porous reservoir such that the second, opposing
15 face of the porous reservoir is in interfacial contact with a part of the second fragrance substrate. Thus a three-part laminate construction of a fragrancing system may be formed and provided, as air treatment composition will be delivered to both the first and second fragrance substrates. It is contemplated and preferred that the respective surface area of the porous reservoir is lesser than the respective surface areas of both the first fragrance
20 substrate and the second fragrance substrate such that all or part of the margins of said fragrance substrates may be used to envelope and preferably seal the porous reservoir within an interior defined by these fragrance substrates. Such a fragrancing system may be provided in a pouch or envelope of material, e.g., polymer, foil, metalized polymer, etc. having good barrier properties, which pouch or envelope is opened by a consumer to
25 withdraw and use the fragrancing system to treat an ambient environment. Optionally a hanger means, e.g., a hook or string is provided to suspend the fragrancing system within an ambient environment to be treated.

Other configurations and embodiments of fragrancing systems according to the invention are contemplated and considered to be within the scope of the present
30 invention.

While the term “air treatment composition” has been utilized in this specification such is to be understood that such is for purposes of convenient reference and not by way of limitation. It is to be understood that virtually any material which can be dispensed from the fragrance substrate into the ambient environment can be utilized and still be
5 considered an air treatment composition for the purposes of the present invention. Thus, a wide variety of volatile materials can be utilized including but not limited to: fragrance materials, air treatment materials which provide an air sanitization benefit, air treatment materials which provide an odor masking or odor counteracting benefit, fragrances, disinfectants, bactericides, fungicides, medicaments, as well as details which provide an
10 insecticidal or other insect controlling benefit. Such volatile materials can be used singly, one combinations of two or more of the above. Similarly the term “fragrance substrate” as used herein does not limit the use of or application of the fragrance substrate for use in the delivery of fragrances or only fragrance compounds from the fragrance system to an ambient environment, but can also be used to deliver other volatile materials, including
15 those recited above, to an ambient environment as well, either concurrently with a fragrance material, or separate from a fragrance material.

Advantageously, the air treatment composition is in a liquid state at room temperature (20°C), when present in the porous reservoir.

In a particularly preferred embodiment, the fragrancing system is used in an air
20 freshener or air fragrancing application, and includes a fragrance. Preferably, the fragrance or air freshener is a fragrance comprising one or more volatile organic compounds which are available from perfumery suppliers such as Firmenich Inc., Takasago Inc., Noville Inc., Quest Co., International Flavors & Fragrances, and Givaudan Corp.

25 A wide variety of chemicals are known for perfumery, such as aldehydes, ketones, esters, alcohols, terpenes, and the like. Most conventional fragrance materials are volatile essential oils. A fragrance can be relatively simple in composition, or can be a complex mixture of natural and synthetic chemical components.

Natural fragrances include naturally derived oils such as camomile oil, Oil of
30 Bergamot, mint oil, cinnamon leaf oil, lemon, orange, lavandin oil and the like. Natural

fragrance include the extracts of blossoms, stems and leaves, fruits, fruit peel, roots, woods, herbs and grasses, needles and branches, resins and balsams.

Typical synthetic perfume compounds are products of the ester, ether, aldehyde, ketone, alcohol and hydrocarbon type. Examples of perfume compounds of the ester type are benzyl acetate, phenyl ethyl acetate, benzyl salicylate. Ethers include, for example, benzyl ethyl ether while aldehydes include, for example, the linear alkanals containing 8 to 18 carbon atoms, citral, citronellal, linal and bourgeonal. Examples of suitable ketones include the ionones and methyl cedryl ketone, while examples of suitable alcohols include anethol, citronellol, eugenol, isoeugenol, geraniol, linalool, phenylethyl alcohol and terpineol. The hydrocarbons mainly include the terpenes and balsams. Other synthetic liquid fragrances include geraniol, geranyl acetate, eugenol, isoeugenol, linalool, linalyl acetate, phenethyl alcohol, methyl ethyl ketone, methylionone, isobomyl acetate, and the like.

It is, however, preferred to use mixtures of different compounds which, together, produce an agreeable fragrance.

In a further embodiment, the fragrancing system is used in an insect control application or with an insect control article, and is used to deliver a natural or synthetic insecticide to an ambient environment. Examples of such insecticides include one or more of: pyrethoid, nicotinoid, rotenoid, Metofluthrin®, Transfluthrin®, Tetramethrin®, Bicallethrin®, Allethrin®, phenthrin, one or more dinitrophenols, one or more organothiocyanate, benzene hexachloride, one or more polychlorinated cyclic hydrocarbons, e.g., Hepatachlor®, Aldrin®, Telodrin®, or one or more organophosphorous compounds, e.g., tetraethyl pyrophosphate.

The fragrancing systems of the invention are easily formed in any of a variety of methods. In a first method, the fragrance substrate and the porous reservoir are placed in physical contact with one another, e.g. by the use of fastener means which include physical elements such as pins, staples, adhesives, or by physical fusion between the fragrance substrate and the porous reservoir (which may be referred to as “tacking” or “spot welding”) such that the fragrance substrate and the porous reservoir are in fluid communication with one another. In a second method, the porous reservoir is placed in a recess, receptacle or article, e.g., a container or part of a device, and the porous

reservoir is then placed in physical contact with the fragrance substrate and is at least partially covered, but preferably is completely covered, by the fragrance substrate. In both foregoing methods, the air treatment material may be added to the porous reservoir or the fragrance substrate or both prior to, during or after forming the fragrancing system.

- 5 In the second aforesaid method, the initial placement of the porous reservoir into a recess, receptacle or article permits for the addition of the air treatment material to the porous reservoir, and prior to the addition of the fragrance substrate.

- The air treatment composition may be provided to the porous reservoir or to the fragrance substrate or to both by any effective means, e.g., dipping or immersion in a bath containing the air treatment composition, pouring the air treatment composition, as well as applying by means of padding or rollers of the air treatment composition. In certain embodiment, preferably the air treatment composition is only applied to or supplied to the porous reservoir while in other preferred embodiments the air treatment composition is supplied to both the fragrance substrate and the porous reservoir. Where the porous reservoir and/or the fragrance substrate is formed of a web (roll) or sheet of material, such may be first provided to a bath containing the air treatment composition, typically in liquid form, and is retained immersed therein until a desired degree of saturation of the said material is achieved. Subsequent to the immersion, the material is subsequently formed such as by cutting or stamping into the ultimately desired shape of the porous reservoir and/or the fragrance substrate. Alternately, the porous material and/or the fragrance substrate can be formed into the ultimately desired shape of the porous material and/or the fragrance substrate prior to the immersion into or contact with the air treatment composition, typically in liquid form part again, such a process can be performed via dipping, or immersing the said material into the air treatment composition for sufficient time such that a desired degree of saturation of the porous material and/or the fragrance substrate is attained.

- Thereafter, the porous material and the fragrance substrate comprising the fragrancing system can be used with a further article, such as for example by insertion into an appropriately shaped cavity of a further article from whence the air treatment composition can be delivered into the ambient environment. Alternately, the fragrancing

system can be used without any further device, such as by simply exposing a fragrancing system to the ambient environment.

An important technical feature of the fragrancing systems according to the present invention resides in the fact that it has been surprisingly and unexpectedly observed that the fragrancing systems are effective in providing a satisfactory amount of an air treatment composition, especially where such is a fragrance oil, to an ambient environment for a period of several weeks without a significant reduction in the perceived levels of the air treatment benefit, viz., a useful fragrancing benefit provided over several weeks by an ordinary consumer. This is particularly surprising as notwithstanding ever increasing depletion of the air treatment composition from within the fragrance substrate, a satisfactory level of perceived delivery of said air treatment composition occurs, with less than a 75% degree of diminishment, preferably less than a 50% degree of diminishment of the perceived level of delivery of the air treatment composition, especially where such as a fragrance, between the perceived level of delivery said air treatment composition following one week of use, and the fourth or fifth successive week of use of the fragrance substrate.

A further surprising technical effect discovered by the inventor was that the fragrance substrates, in certain embodiments, exhibited a reduced level of loss of the air treatment material, e.g., fragrance oil, between the 1st week of use of the fragrance substrate, and later weeks of use of the fragrance substrate, especially in the 3rd and/or 4th and/or 5th week of use of the fragrance substrate. Such may be responsible for the perceived satisfactory fragrancing benefit provided over several weeks by an ordinary consumer.

Advantageously, also the fragrancing systems operate without the need of any power, viz., may operate without the need of an electric fan, electric blower, heating element such as the heating plate or mantle.

The fragrancing system may be included as a part of device, e.g., may be included in a cavity, cage or holder of a device; it is required only that ambient air be permitted to come into contact with one or more surfaces of the fragrance substrates in order that they may release their air treatment composition to the ambient environment of the device. By way of non-limiting example such devices may include air treatment devices, e.g., air

freshener devices, or lavatory devices, such as devices which also provide a cleaning and/or sanitizing composition to a lavatory appliance, e.g., a toilet bowl.

Fig. 1 illustrates a perspective view of a preferred embodiment of a fragrancing system of the invention. Depicted is part of an article (1) which includes a recess or cavity (2) having a defined opening (3) (illustrated in dotted lines on the figure). A porous reservoir (4) is contained within the cavity (2), and is in interfacial contact with a lower face (5b) of a fragrance substrate (5). The fragrance substrate (5) is also partially disposed on the surface (1a) of the article (1) such that it spans the opening (3), and has margins (5m) in layered on the surface (1a) thereby sealing the porous reservoir (4) within the cavity (2). The margins (5m) may form a seal with the surface (1a), or the use of sealing means, e.g., adhesive, heat welding, may be used. As the material used to form at least the recess or cavity (2) has greater barrier properties to the passage of the air treatment composition therethrough than the fragrance substrate (5), and preferably is essentially impervious to the air treatment composition, the air treatment composition may only exit via the fragrance substrate (5), wherein it is delivered to the ambient environment from the upper face (5a).

Fig. 2 depicts a cross sectional view of the embodiment illustrated in Fig. 1.

Fig. 3 depicts in a perspective view an alternate preferred embodiment of a fragrancing system similar in most respects to that described in Fig. 1 and 2, except that the recess or cavity (2) includes an internal wall recess (2a) adapted to receive a perforated plate (6), having one or more perforations (6a) which is used to retain both the fragrance substrate (5) in interfacial contact with the porous reservoir (4) within the recess or cavity (2).

Fig. 4 depicts a cross sectional view of the embodiment illustrated in Fig. 3.

Fig. 5 depicts a cross sectional view of a further embodiment of a fragrancing system illustrating two fragrance substrates (5-1, 5-2) sealed to one another at their margins (5m) thus defining an interior cavity (7) containing a porous reservoir (4) containing a quantity of an air treatment composition. The porous reservoir (4) is in interfacial contact with the lower faces (5b) of each of the two fragrance substrates (5-1, 5-2). In use the air treatment composition within the porous reservoir (4) is transferred to

the two fragrance substrates (5-1, 5-2) from whose upper faces (5a) the air treatment composition is delivered to the ambient environment.

Certain embodiments of the invention are described with reference to one or more of the following examples.

5

Examples:

Test 1:

A number of sample fragrancing systems according to the invention were
10 produced in accordance with the following general protocol, and subsequently tested. The fragrancing systems were included in an article, and had a construction generally as described with reference to the embodiment of Figs. 3 and 4.

Five duplicate articles formed of a blow molded polymer, said articles having identical recesses were used to produce the test fragrancing systems; but for the “control
15 sample”, each included a cavity into which was first introduced a porous reservoir, upon which was layered in register a fragrance substrate, and thereafter an insert of a polyolefin article having a plurality of perforations which functioned as a cover to retain the fragrance substrate and porous reservoir in interfacial contact with each other, and to contain both within the recess. The control sample included neither a fragrance, a porous
20 reservoir or a fragrance substrate. The thickness of the porous substrate utilized varied, and was either 0.46 mm thick, or was 1.22 mm thick when in a dry state, although the shape and surface are remained the same. The thickness of the fragrance substrate also varied, and was wither 0.6 mm thick or 1 mm thick when in a dry state, although the shape and surface remained the same. Prior to insertion into the reservoir, in each of E1
25 – E5, a quantity of an air treatment composition was introduced to the porous reservoir prior; the configurations and loadings of the air treatment composition for the respective test fragrancing systems is reported on the following Table 1:

Table 1						
test fragrancing system:	C1 (control sample)	E1	E2	E3	E4	E5
porous reservoir, dry thickness	--	0.46 mm	1.22 mm	1.22 mm	0.46 mm	1.22 mm
initial loading of air treatment composition on porous reservoir	--	0.34 g	0.65 g	0.65 g	0.34 g	0.65 g
fragrance substrate, dry thickness	--	0.6 mm	1 mm	0.6 mm	1 mm	1 mm

The porous reservoir was a cellulose pad which was the same but for the two different thicknesses. The fragrance substrate can be described as being a DARAMIC 500 CL having an oil content of about 5%, which was used in E1 through E5, and differed only in thickness.

All of the above articles were placed into a controlled storage chamber which maintained an ambient temperature of 25°C and 50% relative humidity within the chamber of the route the duration of the test. At intervals of one week, two weeks, three week, and four weeks each of the replicates were removed from the controlled storage chamber and were evaluated by a series of 22 (human) panelists were asked to evaluate the relative perceived fragrance strength of the replicates of the fragrancing samples in a blind study. One of each of the test fragrancing systems were placed into separate but identical small sensory booths, wherein the actual test fragrancing systems was not visible to the panelist. The "control sample", which was unfragranced was also used and similarly was not visible to the panelist. The panelists were asked to provide a numerical rating of between "0" indicating no perceived fragrance, to "10" indicating a strong perceived fragrance at each weekly interval for each of the tested fragrancing systems.

The results of these tests were averaged for each of the test fragrancing systems and of the control sample; the averaged results for the 22 panelists who participated in the relative perceived fragrance strength of the various fragrancing systems and the control sample in the blind study are indicated on Table 2.

Table 2				
	relative perceived fragrance strength			
test fragrancing system:	week 1	week 2	week 3	week 4
C1	0.8	1.1	0.9	2
E1	4.7	4.5	2.8	5
E2	6	6.4	4.8	5.2
E3	6.5	4.4	6.3	6.4
E5	6.7	4.3	5.8	5.7
E5	6.5	5	5.8	5.9

Surprisingly, the diminishment of the perceived relative fragrance strength did not diminish as quickly as might be initially expected, which demonstrates the long-lasting service life of the tested fragrancing systems.

- 5 While described in terms of the presently preferred embodiments, it is to be understood that the present disclosure is to be interpreted as by way of illustration, and not by way of limitation, and that various modifications and alterations apparent to one skilled in the art may be made without departing from the scope and spirit of the present invention.

10

Claims:

1. A fragrancing system comprising: a fragrance substrate comprising a porous
5 polymer material which comprises one or inorganic materials in particulate form,
and having absorbed or adsorbed an air treatment composition, in fluid
communication with a porous reservoir containing a quantity of an air treatment
composition.
- 10 2. A fragrancing system according to claim 1 wherein the inorganic material of the
fragrance substrate is comminuted silica and/or carbon.
3. A fragrancing system according to claim 2 wherein the inorganic material of the
fragrance substrate is silica.
- 15 4. A fragrancing system according to claim 1 wherein the polymer material of the
fragrance substrate is a polyolefin.
5. A fragrancing system according to claim 1 wherein the porous substrate
20 comprises a fibrous substrate entraining a quantity of an air treatment
composition.
6. A fragrancing system according to claim 1 wherein the porous substrate
comprises an open celled or closed celled hydrophobic polymer sponge entraining
25 a quantity of an air treatment composition.
7. A fragrancing system according to claim 1 wherein the porous substrate
comprises a porous ceramic mass or article entraining a quantity of an air
treatment composition.

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8. A fragrancing system according to claim 1 wherein the porous substrate comprises porous polymer mass or article entraining a quantity of an air treatment composition.
- 5 9. An improved method for delivering an air treatment composition to an ambient environment, which method includes the use of the fragrancing system according to claim 1.
10. A method for the manufacture of the fragrancing system according to claim 1.
- 10 11. An article which comprises the fragrancing system according to claim 1.

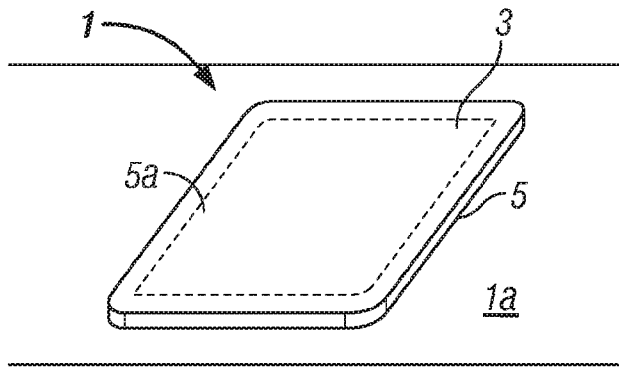


FIG. 1

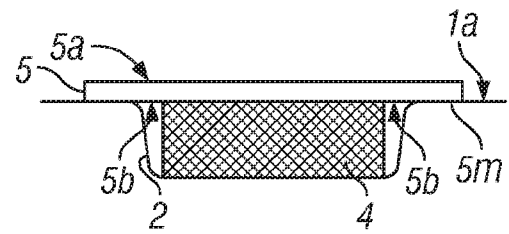


FIG. 2

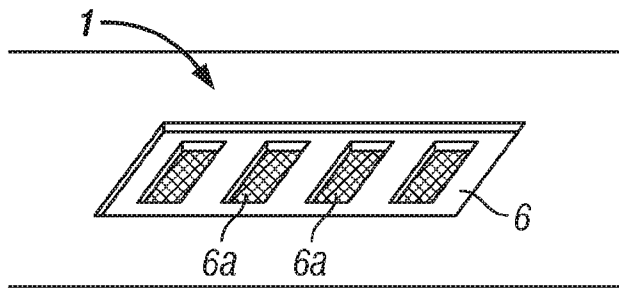


FIG. 3

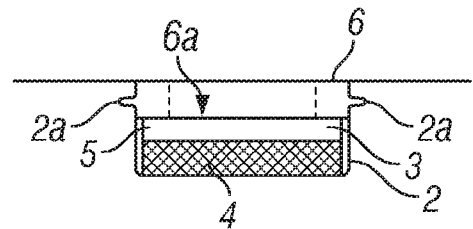


FIG. 4

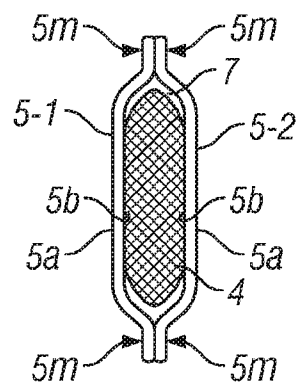


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2010/051208

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61L9/014 A61L9/04
ADD.

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)
A61L

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)

EP0-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X, P	WO 2010/029280 A1 (RECKITT BENCKISER INC [US]; BURT DIANE JOYCE [US]; RECKITT BENCKISER U) 18 March 2010 (2010-03-18) page 3, line 29 - page 5, line 18; claims; examples	1-4, 8-11
Y	US 4 158 440 A (SULLIVAN WILLIAM E ET AL) 19 June 1979 (1979-06-19) column 2, line 23 - column 3, line 26; claims; figures; examples	1-11
Y	US 4 445 641 A (BAKER RICHARD W [US] ET AL) 1 May 1984 (1984-05-01) column 1, line 5 - column 2, line 51; claims; figures; examples	1-11
	----- -/--	



Further documents are listed in the continuation of Box C.



See patent family annex.

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"P" document published prior to the international filing date but later than the priority date claimed

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"&" document member of the same patent family

Date of the actual completion of the international search

1 September 2010

Date of mailing of the international search report

09/09/2010

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INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2010/051208

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 3 661 838 A (ENOMOTO FUMIO) 9 May 1972 (1972-05-09) the whole document -----	1-11

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2010/051208

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