

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
29 November 2007 (29.11.2007)

PCT

(10) International Publication Number
WO 2007/135424 A1

(51) International Patent Classification:

B32B 5/18 (2006.01) *E05B 1/00* (2006.01)
A01N 25/34 (2006.01) *A61L 2/16* (2006.01)

Thorp Arch, Wetherby, West Yorkshire LS23 7RA (GB).
SCOTT-HARDEN, Simon, Geoffrey, John [GB/GB];
Mid Farm, Johnby, Penrith, Cumbria, CA11 0UU (GB).

(21) International Application Number:

PCT/GB2007/001897

(74) Agent: **GILHOLM, Stephen, Pilip**; Gilholm Harrison Limited, Marlborough House, Westminster Place, York Business Park, Nether Poppleton, York YO26 6RW (GB).

(22) International Filing Date: 22 May 2007 (22.05.2007)

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

0610096.0 22 May 2006 (22.05.2006) GB

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(71) Applicants (for all designated States except US): **NON-WOVENS INNOVATION AND RESEARCH INSTITUTE LIMITED** [GB/GB]; Centre For Technical Textiles, Woodhouse Lane, Unviversity Of Leeds, Leeds, West Yorkshire LS2 9JT (GB). **ZELO CREATIVE LIMITED** [GB/GB]; Studio LG3, Aire Street Workshops, 31 Aire Street, Leeds, West Yorkshire LS1 4HT (GB).

(72) Inventors; and

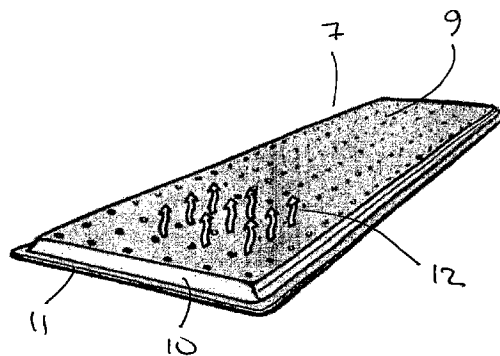
(75) Inventors/Applicants (for US only): **RUSSELL, Stephen, John** [GB/GB]; 41 Hookstone Oval, Harrogate, North Yorkshire, HG2 8QE (GB). **TIPPER, Matthew, James** [GB/GB]; 20 Albion Avenue, York, North Yorkshire, YO26 8RA (GB). **RATHOD, Manoj Kantilal, Chhaganlal** [GB/GB]; 31 Parkland Avenue, Morley, Leeds, West Yorkshire, LS27 0LB (GB). **WALKER, Adam, David** [GB/GB]; 32 Walton Chase,

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: SURFACE MOUNTABLE DELIVERY DEVICE



(57) Abstract: There is described a surface mountable delivery device which has a multi layer construction comprising a liquid permeable support layer adjacent to a porous reservoir layer, the porous reservoir layer being provided with a backing layer. The surface mountable delivery device may comprise of stickers, tapes, pads, tubes, socks, etc.

WO 2007/135424 A1



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

SURFACE MOUNTABLE DELIVERY DEVICE

FIELD OF THE INVENTION

The present invention relates to a novel means of delivering material, such as liquids
5 or gels over a sustained period of time.

In particular the invention provides a novel surface mountable delivery device capable
of protecting surfaces from infection and/or disinfecting surfaces, e.g. door handles,
etc. and/or delivering, for example, an antimicrobial agent as an aid in preventing
10 and/or hindering the spread of infection.

BACKGROUND

It is widely recognised that there is a major problem with the spread of germs from
one place to the next, as people/animals and organisms touch one surface and another.
15 Contact - hence the word "contagious disease", is the most common way that
infection can spread from one individual to another. This transmission of
microorganisms, e.g. germs, bacteria, etc. provides a health hazard as microorganisms
present on the hands/skin/body of people/organisms, are transferred onto the surfaces
of items such as door handles/door knobs/door push plates/ door rails/door
20 leavers/counters/work surfaces/sinks/taps/car handles/towel/rails/bath rails/sink
rails/stair lift rails/banisters, to name but a very small selection of surfaces that are
frequently touched/contacted by a large number of individuals, in a short space of
time. Such surfaces are then touched by the hands/skin/body of other
person/organisms and these microorganisms may be picked up by this new individual.
25 If this new individual then makes contact with an open skin surface, such as a

cut/abrasion or makes oral contact, there is a strong chance that the bacteria could be transmitted into their body system. Once in the body system, these bacteria could cause a: cold, flu, mumps/missals, conjunctivitis, diarrhoea, bronchitis, dermatological disorders or sickness for example.

5

However, these are not the worst-case results of transmitting bacteria from one individual to the next, through surface contact. There are many nasty diseases that can be considered contagious; one of the most deadly viruses that can be transmitted by surface contact is methicillin-resistant *Staphylococcus aureus* (MRSA).

10

The organism *Staphylococcus aureus* is found on many individuals skin and seems to cause no major problems. However, if *Staphylococcus aureus* gets inside the body, for instance under the skin or into the lungs, it can cause important infections, such as pneumonia. Individuals who carry this organism may be or appear healthy, have no

15 problems whatever and are considered simply to be carriers of the organism.

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a specific strain of the *Staphylococcus aureus* bacterium that has developed antibiotic resistance to all penicillins, including methicillin. MRSA. Methicillin was an antibiotic used many

20 years ago to treat patients with *Staphylococcus aureus* infections. It is now no longer used except as a means of identifying this particular type of antibiotic resistance. Individuals can become carriers of MRSA in the same way that they can become a carrier of ordinary *Staphylococcus aureus* which is by physical contact with the organism, for example, if the organism is on the skin then it can be passed around by

25 physical contact. If the organism is in the nose or is associated with the lungs rather

than the skin then it may be passed around by droplet spread from the mouth and/or nose.

5 MRSA organisms are often associated with patients in hospitals but can also be found on patients not in a hospital. Usually it is not necessary to do anything about MRSA organisms. However if MRSA organisms are passed on to someone who is already ill, then a more serious infection may occur in that individual. When patients with MRSA are discovered in a hospital, the hospital will usually try to prevent it from passing around to other patients. This is known as infection control. Measures to
10 prevent the spread of organisms from one person to another are called isolation or infection control. The type of infection control or isolation required for any patient depends, *inter alia*, on the organism, where the organisms are found on/in an individual and the patient. The most important type of isolation required for MRSA is what is called “contact isolation”. This type of isolation requires everyone in contact
15 with the patient to be very careful about hand washing after touching either the patient or anything in contact with the patient.

One very important point about infections and viruses that spread in hospitals, is that about 10% of infections in the UK's public hospitals have been estimated to be
20 airborne. This means that approximately 90% of infections are therefore transmitted in other ways, such a through contact with surfaces and other individuals.

Biosecurity is a term that covers the actions and measures needed to be taken to safeguard individuals from diseases caused by viral, bacterial and fungal infections.
25 Biosecurity is essential against the fight of these contagious diseases.

Thus, it is highly desirable to provide a means of reducing the spread of microorganism, e.g. in, hospitals, (where surfaces are regularly touched by many people), doctors waiting rooms and doors, public houses including door handles and furniture, veterinary buildings and doors etc, as well as office equipment/computer keyboards/mice etc. This is just a minute example of the applications for this invention, but it does however represent some of the most beneficial areas to aim the invention, to gain the best results against the spread of contagious diseases. A number of attempts have been made to address this.

10

Thus, for example, US Patent No. 5,407,685 describes a film for releasing an anti-microbial agent, oxygen and a medicament comprising a flexible, porous layer and dry reagents which react in the presence of a diluent.

15

US Patent No. 5,882,667 describes a sterile rigid sleeve produced from a mixture of a plastic and an antimicrobial agent form of an elongated rigid cylinder which is the shaft of a writing pen.

20

U.S. Patent No. 6,298,521 discloses a housing containing a sublimable disinfectant, the housing having an adhesive on the rear end for securing it to the backing plate behind a door knob. The housing has circumferential slots in the front end so that the sublimable disinfectant vapours may reach the door knob.

25

US patent No. 6,863,960 describes a user-activatable substance delivery system for, e.g. soaps, fragrances, lotions, adhesives, and the like comprising a first web and a

second web joined together in a face to face relationship and being joined about their respective peripheries to define a void space therein; which houses a fluid.

US Patent No. 6,821,325 describes a multi-surface antibacterial protective device comprising, an under layer of material and an over a layer of a permeable material and a cavity disposed between the two. The cavity houses an antibacterial solution. Whilst US '325 addresses the same problem as the present invention, there is little or no control over the seepage of the antibacterial agent from the cavity. Furthermore, when a liquid is used in the cavity, settlement of the liquid to the bottom of the system occurs, particularly when it is oriented vertically in use. Failure to address settlement causes a variation in the amount of liquid delivered from top to bottom, which becomes more pronounced as the system is progressively emptied of solution. Clearly, such a variation in the delivery rate across the system is a major concern where the system is applied to walls and door plates, etc. and this has been addressed in the new design.

Therefore, there remains a long felt want for a suitable material which is capable of acting as a barrier material and a controllable reservoir for one or more active ingredients, bactericide, viruscide, fungicide, etc.

STATEMENT OF INVENTION

Therefore, according to a first aspect of the invention we provide A surface mountable delivery device which has a multi layer construction comprising a liquid permeable support layer adjacent to a porous reservoir layer, the porous reservoir layer being provided with a backing layer.

The liquid permeable support layer is, in use, a top layer or an outer layer. The layer is a liquid permeable film or membrane. The film may be a porous film or a perforated film, e.g. a micro perforated film. It is preferentially, a microperforated film in which the permeability is dependent upon the transverse pressure that is applied to the entire construction in use. A variety of films may be used, thus, the film may be selected from any conventionally known film-forming polymer. Preferably, the film will be compatible with printing. Also, the film will be non-degradable and/or soluble in water or when in contact with an alcohol or an oil-water emulsion. It is especially importantly that the printed surface should be insensitive to alcohol, e.g. ethanol, which forms the basis of many commercially available antibacterial formulations e.g. Cutan[®].

Thus, the perforated support film may be hydrophobic polymer, such as polyethylene (PE), polypropylene (PP) or polyethylene terephthalate (PET) and copolymers thereof.

The pore openings of the microperforated film may vary depending, *inter alia*, upon the nature and composition of the antibacterial formulation present in the porous reservoir layer. Thus the pores of the microperforated film may consist of sub-micron dimensions, however, preferentially, a microperforated film with openings of from 20-500µm diameter may be used, that is for example more than 50% of the pores have a diameter in the range of from 20-500µm, preferably more than 70%, more preferably more than 90%. It is particularly advantageous if the support layer, e.g. the perforated film is has some elastic properties so that the pore openings may open to

their maximum extent due to the fluid forces introduced by evacuation of the liquid/gel from the porous reservoir layer and then self-close to some extent by elastic recovery of the film when the compression is removed from the system and the fluid flow ceases. Nevertheless, it should be understood that perforated high modulus films
5 may also be suitable. Furthermore, it may be advantageous for each of the layers in the multi layer device to possess elastic properties.

The porous reservoir layer may comprise a variety of materials, such as one or more of a foam, a woven material or nonwoven material, although a nonwoven material
10 may be preferred. The porous reservoir may comprise a composite material and/or may comprise a multilayer material. Such a nonwoven material may be composed of a variety of materials, such as, cellulose pulp or other absorbent fibrous material, capable of holding liquid within and between the pores of adjacent fibres. The porous reservoir preferentially has a high capillary action as this is especially advantageous
15 when the device is in use in a vertical position. In a further alternative the porous layer may comprise a plurality of chambers each containing a porous material as hereinbefore described. The porous reservoir layer may preferably be contiguous with the permeable support layer.

20 A backing third layer may be provided on the porous reservoir layer that prevents penetration of active liquid through and which prevents evaporation. This backing layer is preferably an unperforated and non-permeable film composed of a hydrophobic polymer. Exemplary hydrophobic polymers include polyethylene (PE), polypropylene (PP) or polyethylene terephthalate (PET) and copolymers thereof.

25

The device of the invention may include means for attaching the device to a surface. This may comprise an attaching means, e.g. a Velcro[®] arrangement or may comprise one or more adhesive surfaces. The delivery device may be design to attaché to the surface or to attach to itself, by wrapping around a surface. In a preferred
5 embodiment the attaching means comprises an adhesive, for example, the backing layer is coated or substantially coated with an adhesive layer, e.g. a pressure-sensitive adhesive, to enable fixation of the surface mountable delivery device to various surfaces. Such an adhesive layer may be applied to the backing layer or alternatively the backing layer may itself comprise an adhesive provided that such an adhesive is
10 contiguous over the surface of the porous layer and prevents penetration of active liquid through and which prevents evaporation. Alternatively, if the porous layer is not contiguous with the permeable layer, adhesive may be applied to the surface of the permeable layer that is exposed adjacent to the porous layer. The adhesive is preferably a pressure sensitive adhesive which may optionally be alcohol soluble, thus
15 enabling it to be removed from surfaces when the delivery device of the invention is removed. The pressure sensitive adhesive may be an acrylic adhesive such as an acrylate ester copolymer adhesive formed by the copolymerization of 2-ethyl-hexyl acrylate, butyl acrylate and acrylic acid. Alternatively, the adhesive layer may be an adhesive such as polyvinyl alkyl ether adhesive.

20

In a preferred aspect of the invention the liquid permeable first layer and the backing layer may be capable of thermoplastic bonding, e.g. ultrasonic joining.

25

In use, the porous reservoir layer contains an active agent, e.g. is impregnated or impregnable with any conventionally known active agents, such as, an active agent

selected from one or more of an antimicrobial agent, a medicament, a cosmetic a
perfume, and a deodorant. In a preferred aspect of the present invention the active
agent is an antimicrobial agent. The active agent may be present in a form selected
from form selected from solid, liquid, gel, suspension, emulsion and
5 microencapsulated. Preferably, the active agent will be present in liquid or gel form.
The term antimicrobial will be well understood by the person skilled in the art and
shall include antibacterial, antifungal and antiviral compositions; and mixtures
thereof. The term antibacterial shall include bactericidal and bacteristatic
compositions.

10

Any conventionally known antibacterial compositions may be used, including, for
example, alcohols, such as "surgical alcohols", e.g. ethanol, 1-propanol and 2-
propanol/isopropanol; or mixtures thereof. Other antibacterial compositions which
may be mentioned include, quaternary ammonium compounds, such as benzalkonium
15 chloride, chlorhexidine, iodine, phenol (carbolic acid) compounds or silver
compounds; or mixtures thereof. A preferred antibacterial composition is an alcohol,
such as that commercially available as Cutan[®] from Deb Limited in the UK. An
especially preferred antibacterial agent has an alcohol content of from 58 to 78% w/w,
preferably from 68 to 72% w/w and most preferably alcohol content of 70% w/w.

20

It is an especially preferred feature of the present invention that the device is adapted
to remain bacteristatic during its lifetime.

A further preferred antibacterial agent is one which is capable as acting as bactericidal
25 agent or bacteristatic agent, e.g. to MRSA. The antibacterial agent is especially a

bactericidal agent or a bacteristatic agent to one or more of MRSA, MSSA, Necrotizing fasciitis, Escherichia coli, NorA, Clostridium difficile, Norovirus, enterococcus faecium and pseudomonas aruginosa. For example, vancomycin, methicillin, etc.

5

Examples of antifungal agents include, boric acid, or combined antibacterial and antifungal agents, such as triclosan,

10

The total loading of antimicrobial agent in the porous reservoir layer is dependent upon, *inter alia*, the fabric thickness and density. This determines the total pore volume or porosity of the layer and therefore its absorbent capacity. The delivery rate may be controlled by the compression resistance of the fabric, the total loading of the active agent, e.g. liquid, the perforated hole sizes in the support layer and the viscosity of the liquid. The latter can be controlled by additives, such as a thickener, if required. However, impregnation of the porous reservoir layer is typically by saturation, thus allowing the highest loading possible and providing the longest duration of activity, e.g. antimicrobial activity.

15

20

Thus, according to a further aspect of the invention we provide a surface mountable delivery device as hereinbefore described wherein the porous reservoir layer is loaded with an active agent. The active agent is preferentially an antimicrobial agent as hereinbefore described.

In the material of the invention the permeable support layer may also be provided with a removable cover layer as protection. Such a cover layer may be capable of preventing the pores from becoming blocked prior to putting the surface skin in place where the antimicrobial activity is required. Similarly, if the backing layer is provided with an adhesive layer then the adhesive layer and/or the backing layer may also be provided with a cover layer. The removable cover may be, for example, a silicone coated release paper. Alternatively, the whole delivery device may be presented in a sealed package.

10 The surface mountable delivery device of the invention may be made up in a variety of forms. By way of illustration, such forms include, but shall not be limited to, stickers, tapes, pads, tubes, socks and the like.

The surface mountable delivery device of the invention may include an indicator, such as an obsolescence indicator. This may be a time activated indicator or it may be adapted to provide an indication of the internal state of the reservoir layer.

The device may also be substantially biodegradable and/or compostable.

20 In a further preferred embodiment of the invention we provide a method of preventing the transmission of microorganisms which comprise the use or application of a surface mountable delivery device as hereinbefore described.

The surface mountable delivery device of the present invention is advantageous over prior art devices since the present invention does not use a filled internal cavity but

rather a porous material e.g. a nonwoven material, with a high internal surface area (due to the fibres) and a porosity of ca. 75-99% to store the liquid, gel, etc. The use of, e.g. a nonwoven material, prevents the settlement of the liquid to the bottom of the system. The liquid is held between the fibre surfaces and spreads through the middle
5 layer partly by means of capillary action, g a “wicking” effect. The liquid is therefore physically held between fibres and does not flow out through the support layer film unless the porous layer is compressed.

Furthermore, in the design of the present invention the solution does not seep through
10 the permeable layer but is transported only by forced flow (induced by applied pressure) through the film. Compression of the porous material within the system effectively squeezes out the solution through the outer film support layer. In an ideal embodiment of the present invention the film support layer is permeable to liquid only when compressed. This helps to prevent evaporation and therefore renders the system
15 active for a period of 1 day to a maximum of about 14 days. The support layer film surface of the system is therefore intended to be completely dry unless the system is compressed to deliver the solution to the contact point.

The invention will now be referred to by the following figures 1-10, which show/
20 represent various forms/states and designs, the invention could take and in which
Figure 1 is a cross-section of a surface skin of the invention;
Figure 2 is a cross-section of a surface skin of the invention provided with an adhesive layer;
Figure 3 is a cross-section of a surface mountable delivery device of the invention in
25 which the permeable layer and the backing layer are sealed together;

Figure 4 is a cross-section of a surface mountable delivery device of the invention with adhesive and a removable cover layer;

Figure 5 is a schematic representation of a cruciform pad applied to a door handle;

Figure 6 is a schematic representation of tape applied to a door handle;

5 Figure 7 is a schematic representation of a tube or sock applied to a door handle;

Figure 8 is a schematic representation of a round shape applied to a door knob;

Figure 9 is a schematic representation of a tape applied to a door knob;

Figure 10 is a schematic representation of a pad applied to a push plate;

Figure 11 is a schematic representation of a pad with the cover being removed;

10 Figure 12 is a schematic representation of a pad applied to a push plate; and

Figure 13 is a schematic representation of a multilayered pad applied to a door handle.

Figure 1: A surface skin material comprises a liquid permeable support layer (1) adjacent to a porous reservoir layer (2), the porous reservoir layer (2) being provided
15 with a backing layer (3).

Figure 2: A surface skin material comprises a liquid permeable support layer (1) adjacent to a porous reservoir layer (2), the porous reservoir layer (2) being provided with a backing layer (3) and the backing layer (3) being provided with an adhesive
20 layer (4).

Figure 3: A surface skin material comprises a liquid permeable support layer (1) adjacent to a non-contiguous porous reservoir layer (2), the porous reservoir layer (2) being provided with a backing layer (3) which also may be sealed against the support
25 layer (1).

Figure 4: A surface skin material comprises a liquid permeable support layer (1) adjacent to a porous reservoir layer (2), the porous reservoir layer (2) being provided with an adhesive layer (4) and the adhesive layer (4) being provided with a releasable cover or protector layer (5 & 6).

Figure 5: Represents an antibacterial/viral pad/patch/sticker/plaster/sock, which may be cross shaped/triangular shape/rectangular and/or of a tape like construction, which may or may not have a form of adhesive/sticky pad or patch on the back. This antibacterial pad/patch/sticker/plaster may or may not be stretchy/elastic in nature so that it may/may not contort and distort to best form around a desired surface, such as a door handle for example, as shown by (B). (See list at the end of the figures for other desired surfaces). (A) Shows the invention in the context of a door handle, however, this could be any form of surface/product. (C) Shows one example of the shape of the invention, although it could be square, circular, rectangular, triangular, oblong, tubular, elliptical, or any other shape/construction. (D) Denotes that the invention may or may not have a logo anywhere on the invention, which may be a health care organisation/company or any other name/brand.

This antibacterial/anti viral pad/patch/sticker/plaster may be made from a polymer, composite polymer, rubber, plastic, woven fabric and or injection moulded, extruded, woven, pressed, die cut, stamped, blow moulded method.

Figure 6: Represents the invention in a different form. (B) Shows how the antibacterial/anti viral pad/patch/sticker/plaster/sock may or may not be in the form of

tape/webbing/strapping/strip which may or may not have a form of adhesive/sticky pad or patch on the back. (A) Shows the invention in the context of a door handle, however, this could be any form of surface/product as listed below. (C) Shows that it may or may not have a logo. (D) Shows that it may/may not be in the form of a
5 tape/webbing/strapping/strip. (E) Shows that it may/may not be in the shape of a viral pad/patch/sticker/plaster.

This antibacterial/anti viral pad/patch/sticker/plaster/sock may be made from a polymer, composite polymer, rubber, plastic, and or injection moulded, extruded,
10 woven, pressed, die cut, stamped, blow moulded method.

Figure 7: Shows the invention in a different form. (B) Shows the antibacterial/anti viral pad/patch/sticker/plaster in the form of a tube/sock which may or may not be open or closed as a tube. This form of the invention may be sleeved over the desired
15 surface, which could be a door handle for one example, shown by (A). (C) Denotes that the invention may or may not have a logo. (D) Shows the invention in an open sock state, which is essentially a tube of material, which may or may not be elasticated/expandable, so that when it sleeves over a surface it can contract to secure/lock in place. It may or may not also have adhesive/sticky surfaces on it to help
20 secure in a position. (E) Shows the invention in an open state. In this state the invention can be opened up to wrap around a surface and then closed back together with a form of attachment on the invention. This form of attachment may or may not be an adhesive/sticky surface, clips, Velcro, etc.

This antibacterial/anti-viral pad/patch/sticker/plaster/sock may be made from a polymer, composite polymer, rubber, plastic, and or injection moulded, extruded, woven, pressed, die cut, stamped, blow moulded method.

5 **Figure 8:** Shows the invention in another form and in the context of a door knob/cylindrical handle/rounded surface. (A) Represents the antibacterial/anti viral pad/patch/sticker/plaster/sock and (B) represents a round surface such as a doorknob. (C) Shows the invention in contact with (D) the door knob/cylindrical handle/rounded surface, which will have a form of keeping it attached to the desired surface. This may
10 through a sticky/adhesive surface or an elasticised/expandable material which contracts to grip the desired surface.

This antibacterial/anti viral pad/patch/sticker/plaster/sock may be made from a polymer, composite polymer, rubber, plastic, and or injection moulded, extruded,
15 woven, pressed, die cut, stamped, blow moulded method.

Figure 9: Shows how the antimicrobial pad, patch, sticker, plaster, sock attaches to a door knob/cylindrical handle/rounded surface/ curved surface if made in a pad, patch, sticker, plaster, sock, tape, webbing, strapping, format.

20

This antibacterial/anti viral pad/patch/sticker/plaster/sock may be made from a polymer, composite polymer, rubber, plastic, and or injection moulded, extruded, woven, pressed, die cut, stamped, blow moulded method.

Figure 10: Shows an antibacterial/anti viral pad/patch/sticker/plaster/sock, which may or may not fit over/onto a push plate on a door for example. (A) Shows the invention, which may then fit over/onto (B), which represents a push surface. This push surface may be on any product/surface. For this example it is shown in the context of a door.

5 It may however be attached to any surface.

This antibacterial/anti viral pad/patch/sticker/plaster may be made from a polymer, composite polymer, rubber, plastic, and or injection moulded, extruded, woven, pressed, die cut, stamped, blow moulded method.

10

Figure 11: Shows an antibacterial/anti viral pad/patch/sticker/plaster/sock which may or may not fit over/onto a push plate on a door for example. (C) Shows the front of the invention, which may or may not include a logo. (D) Shows the back of the invention, which has a form of attaching it to a surface. This may or may not be in the form of an

15 adhesive/sticky surface.

15

Figure 12: Figure 12(a) shows an antibacterial pad (7) with an “activation” film cover layer (8) in place. In figure 12(b) the “activation” film cover layer (8) is removed, exposing the perforated support layer (9). The porous reservoir (10) and backing layer (11) are also shown. Figure 12(c) schematically represents liquid (12)

20 passing through the perforated support layer (9).

20

Figure 13: Figure 13(a) shows an antibacterial pad (13) with an “activation” film cover layer (14) in place and a multilayered reservoir (15). In figure 13(b) the

25 “activation” film cover layer (14) is removed, exposing the perforated support layer

25

(16). The backing layer (17) is also shown. Figure 13(c) shows the pad (13) fixed to a door handle (18).

This antibacterial/anti viral pad/patch/sticker/plaster may be made from a polymer,
5 composite polymer, rubber, plastic, and or injection moulded, extruded, woven,
pressed, die cut, stamped, blow moulded method.

All the examples of the various forms of the invention may or may not have an anti
viral killing substance in/on/or impregnated within and are designed to be attached to
10 any surface.

In all of the designs shown from figures 5 to 11 the pad, patch, sticker, plaster, tube,
sock, could be applied to the surface of: door handles/door knobs/push plates/push
pads/grab handles/grab rails/banister rails/towel rails/ work
15 surfaces/taps/knobs/dials/buttons/steering wheels/chairs/chair arms/ doors/computer
equipment/computer mice/keyboards/electronic equipment/public transport/public
seats/bus stops/street furniture/glass surfaces/wood surfaces/metal surfaces/plastic
surfaces/office equipment/pubic house furniture and fittings/toilet handles/light
fittings/plugs/plug sockets/public furniture/public transport/hospital
20 equipment/surgical instruments/doctor waiting rooms/surgery clinic
surfaces/veterinary clinic surfaces and equipment/tools and any surface touched by
organisms/individuals/people/animals.

25

Claims

1. A surface mountable delivery device which has a multi layer construction
5 comprising a liquid permeable support layer adjacent to a porous reservoir layer, the porous reservoir layer being provided with a backing layer.
2. A surface mountable delivery device according to claim 1 wherein the liquid
permeable support layer is a perforated film.
10
3. A surface mountable delivery device according to claim 2 wherein the
perforated film is microperforated.
4. A surface mountable delivery device according to claim 1 wherein the liquid
15 permeable support layer is a porous film.
5. A surface mountable delivery device according to claim 1 wherein the liquid
permeable support layer comprises a film-forming polymer.
- 20 6. A surface mountable delivery device according to claim 1 wherein the liquid
permeable support layer is compatible with printing.
7. A surface mountable delivery device according to claim 1 wherein the
permeable support layer is non-degradable and/or soluble in water or when in contact
25 with an alcohol or an oil-water emulsion.

8. A surface mountable delivery device according to claim 7 wherein the permeable support layer is insensitive to alcohol.

9. A surface mountable delivery device according to claim 2 wherein the pore openings in the liquid permeable support layer consist of sub-micron dimensions

10. A surface mountable delivery device according to claim 3 wherein the pore openings in the liquid permeable support layer consist of openings of from 20-500 μ m diameter,

10

11. A surface mountable delivery device according to claim 10 wherein more than 50% of the pores have a diameter in the range of from 20-500 μ m,

12. A surface mountable delivery device according to claim 11 wherein more than 70% of the pores have a diameter in the range of from 20-500 μ m.

15

13. A surface mountable delivery device according to claim 12 wherein more than 90% of the pores have a diameter in the range of from 20-500 μ m.

14. A surface mountable delivery device according to claim 1 wherein the liquid permeable support layer has elastic properties.

20

15. A surface mountable delivery device according to claim 14 wherein each of the layers of the delivery device has elastic properties.

25

16. A surface mountable delivery device according to claim 1 wherein the liquid permeable support layer comprises a hydrophobic material.

17. A surface mountable delivery device according to claim 1 wherein the porous
5 reservoir layer comprises one or more of a foam, a woven material or a nonwoven material.

18. A surface mountable delivery device according to claim 17 wherein the porous reservoir layer comprises a composite material.

10

19. A surface mountable delivery device according to claim 17 wherein the porous reservoir layer comprises a foam.

20. A surface mountable delivery device according to claim 17 wherein the porous
15 reservoir layer comprises a nonwoven material.

21. A surface mountable delivery device according to claim 1 wherein the porous reservoir layer comprises a multilayer material.

20 22. A surface mountable delivery device according to claim 20 wherein the non-woven material is composed of a cellulose pulp or other absorbent fibrous material, capable of holding liquid within and between the pores of adjacent fibres.

23. A surface mountable delivery device according to claim 1 wherein the porous
25 reservoir layer is contiguous with the permeable support layer.

24. A surface mountable delivery device according to claim 1 wherein the backing layer is an unperforated and non-permeable film.

5 25. A surface mountable delivery device according to claim 1 wherein the backing layer comprises a hydrophobic polymer.

26. A surface mountable delivery device according to claim 25 wherein the hydrophobic polymer is selected from the group consisting of polyethylene (PE),
10 polypropylene (PP) or polyethylene terephthalate (PET) and copolymers thereof.

27. A surface mountable delivery device according to claim 1 wherein the delivery device includes means for attaching the system to a surface.

15 28. A surface mountable delivery device according to claim 27 wherein the delivery device is capable of being wrapped around a surface and includes means for attaching the system to itself.

29. A surface mountable delivery device according to claim 27 wherein the
20 attaching means comprises a Velcro[®] arrangement.

30. A surface mountable delivery device according to claim 27 wherein the means for attaching the system to a surface comprises an adhesive coating.

31. A surface mountable delivery device according to claim 30 wherein the means for attaching the system to a surface comprises an adhesive coating on the backing layer.

5 32. A surface mountable delivery device according to claim 30 wherein the adhesive is alcohol soluble.

33. A surface mountable delivery device according to claim 30 wherein the adhesive is a pressure-sensitive adhesive.

10

34. A surface mountable delivery device according to claim 1 wherein the liquid permeable support layer and the backing layer are capable of being bonded together.

15 35. A surface mountable delivery device according to claim 34 wherein the liquid permeable support layer and the backing layer are capable of thermoplastic bonding.

36. A surface mountable delivery device according to claim 35 wherein the thermoplastic bonding comprises ultrasonic joining.

20 37. A surface mountable delivery device according to claim 1 wherein the porous reservoir layer contains an active agent.

25 38. A surface mountable delivery device according to claim 37 wherein the active agent is selected from one or more of an antimicrobial agent, a medicament, a cosmetic a perfume, and a deodorant.

39. A surface mountable delivery device according to claim 37 wherein the active agent is in a form selected from solid, liquid, gel, suspension, emulsion and microencapsulated.

5

40. A surface mountable delivery device according to claim 39 wherein the active agent is in a liquid or gel form.

10

41. A surface mountable delivery device according to claim 40 wherein the active agent is in a liquid form and includes a thickener.

42. A surface mountable delivery device according to claim 38 wherein the active agent is a medicament.

15

43. A surface mountable delivery device according to claim 38 wherein the active agent is an antimicrobial agent.

44. A surface mountable delivery device according to claim 1 wherein the support layer contains an antimicrobial agent.

20

45. A surface mountable delivery device according to claim 44 wherein the antimicrobial agent is an antibacterial agent.

25

46. A surface mountable delivery device according to claim 45 wherein the antibacterial agent is selected from one or more of an alcohol, quaternary ammonium

compounds, chlorhexidine, iodine, phenol (carbolic acid) and silver compounds; or mixtures thereof.

5 47. A surface mountable delivery device according to claim 46 wherein the antibacterial agent has an alcohol content of from 58 to 78% w/w.

48. A surface mountable delivery device according to claim 47 wherein the antibacterial agent has an alcohol content of from 68 to 72% w/w.

10 49. A surface mountable delivery device according to claim 48 wherein the antibacterial agent has an alcohol content of 70% w/w.

50. A surface mountable delivery device according to claim 45 wherein the antibacterial agent is bactericidal agent or bacteristatic agent.

15

51. A surface mountable delivery device according to claim 50 wherein the device is adapted to remain bacteristatic during its lifetime.

20 52. A surface mountable delivery device according to claim 50 wherein the antibacterial agent is bactericidal agent or bacteristatic agent to one or more of MRSA, MSSA, Necrotizing fasciitis, Escherichia coli, NorA, Clostridium difficile, Norovirus, enterococcus faecium and pseudomonas aruginosa.

25 53. A surface mountable delivery device according to claim 43 wherein the antimicrobial agent is an antifungal agent.

54. A surface mountable delivery device according to claim 53 wherein the antibacterial agent is a combined antibacterial and antifungal agent.

5 55. A surface mountable delivery device according to claim 1 wherein the porous reservoir layer is saturated.

56. A surface mountable delivery device according to claim 1 wherein the backing layer is an adhesive layer.

10

57. A surface mountable delivery device according to claim 1 or 56 wherein the porous layer/adhesive layer is provided with a removable cover layer.

15 58. A surface mountable delivery device according to claim 1 wherein the support layer is provided with a removable cover layer.

59. A surface mountable delivery device according to claim 58 wherein the removable cover layer activates the active agent upon removal of the cover layer.

20 59. A surface mountable delivery device according to claims 57 or 58 wherein the removable cover is a silicone coated release paper.

60. A surface mountable delivery device according to claim 1 in the form of a sticker, tape, pad, tube or sock.

25

61. A surface mountable delivery device according to claim 1 wherein the device includes an indicator.

5 62. A surface mountable delivery device according to claim 61 wherein the indicator is an obsolescence indicator.

63. A surface mountable delivery device according to claim 62 wherein the indicator is a time activated indicator.

10 64. A surface mountable delivery device according to claim 62 wherein the indicator provides an indication of the internal state of the reservoir layer.

65. A surface mountable delivery device according to claim 1 wherein the device is substantially biodegradable and/or compostable.

15

66. A method of preventing the transmission of microorganisms which comprises the use or application of a surface mountable delivery device according to claim 1.

20 67. The surface mountable delivery device substantially as herein described with reference to the accompanying drawings.

25

30

35

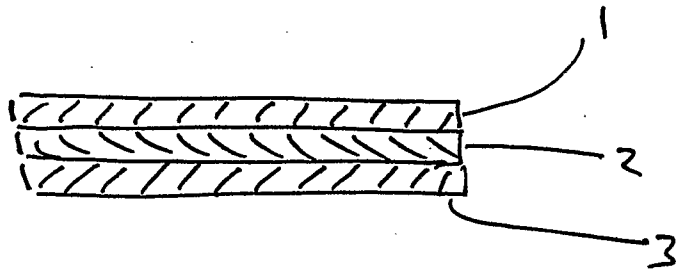


Fig. 1

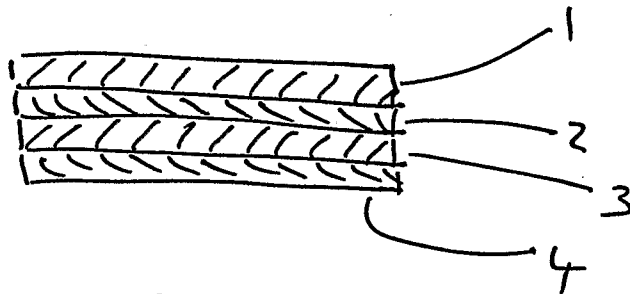


Fig. 2

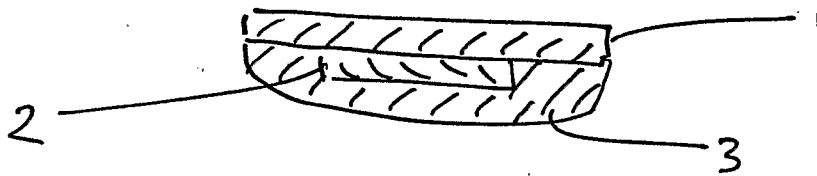


Fig. 3

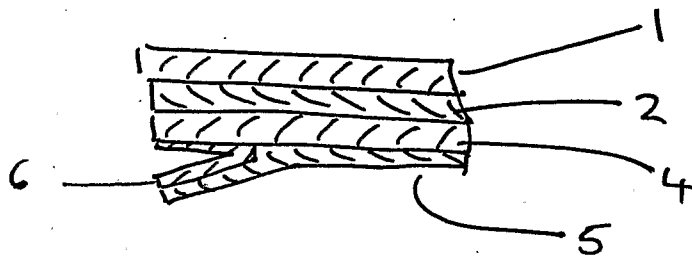
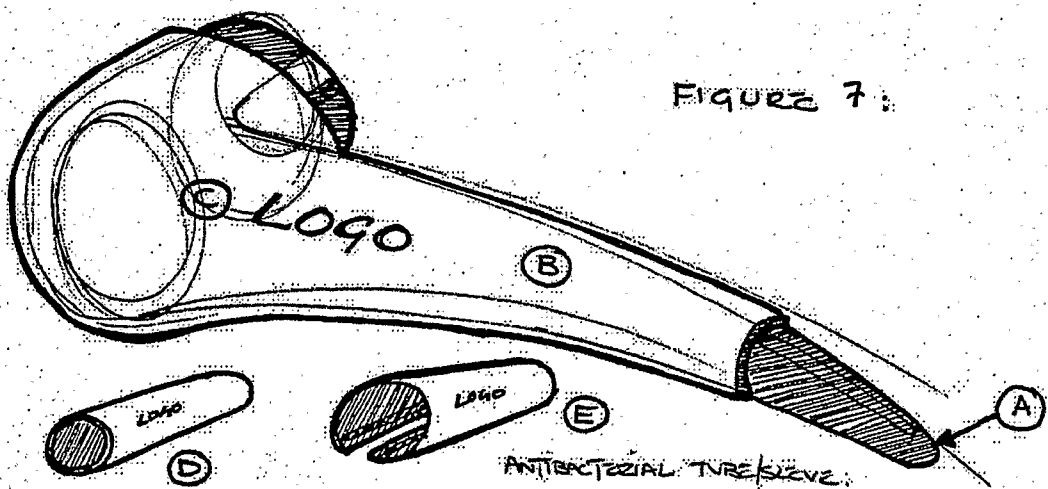
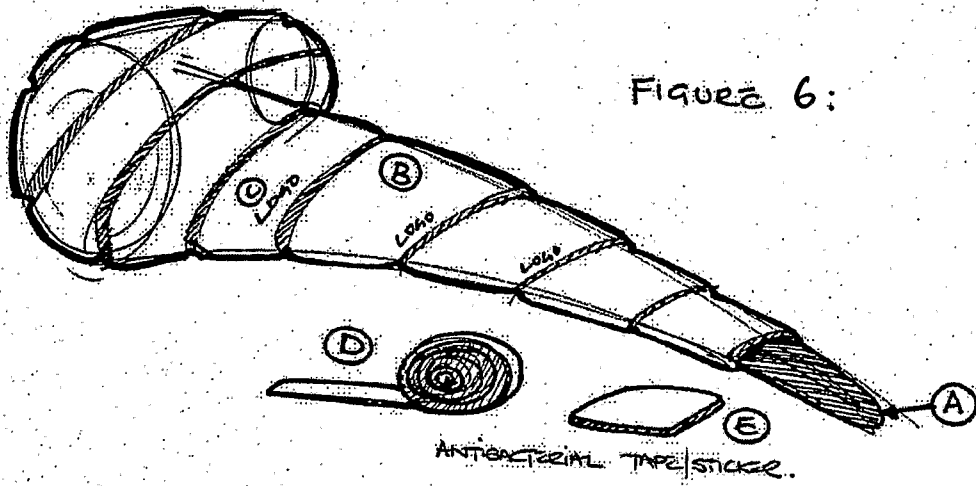
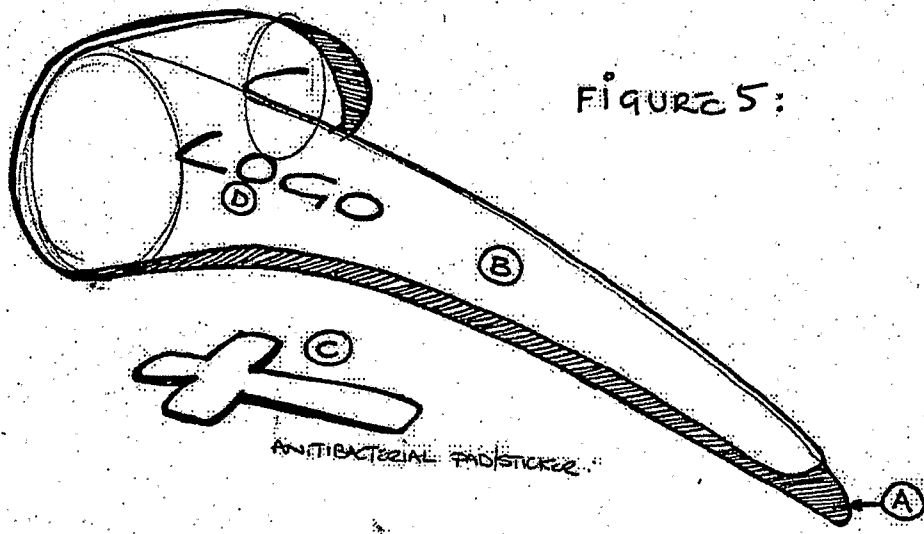


Fig. 4



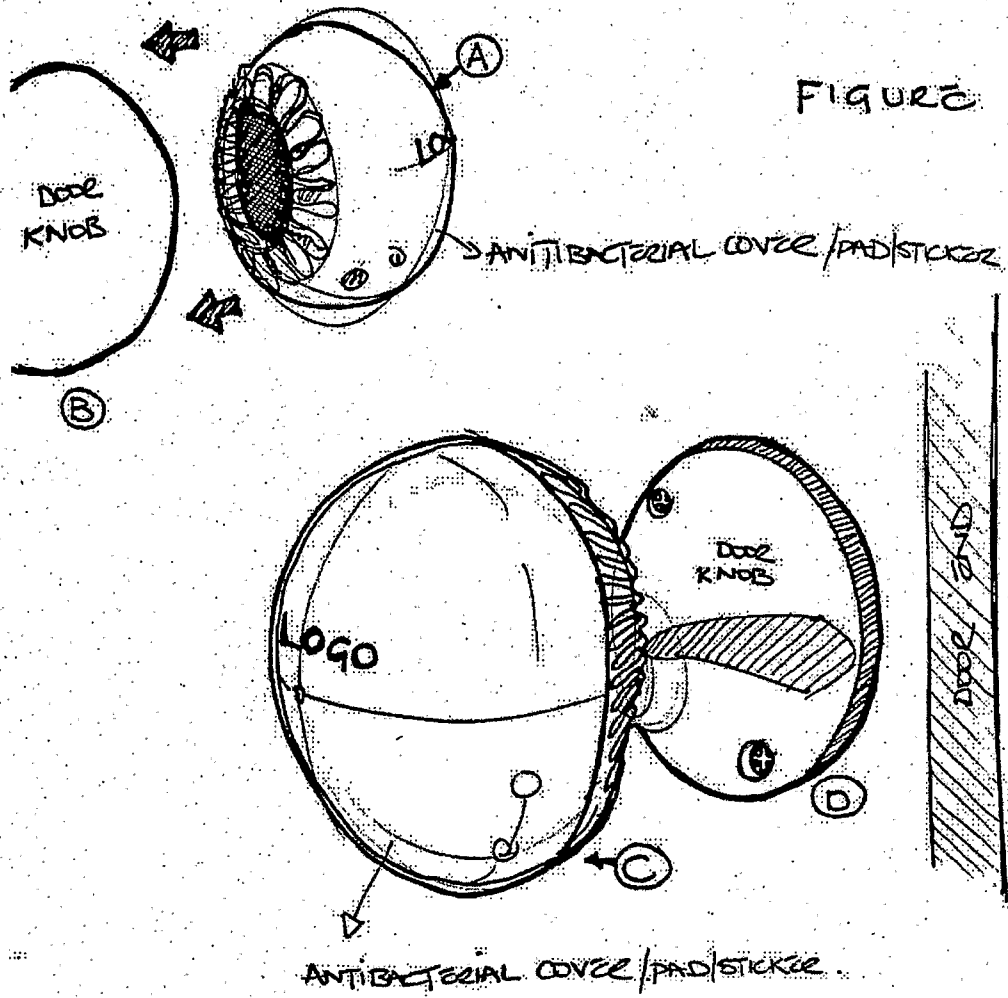


FIGURE 8:

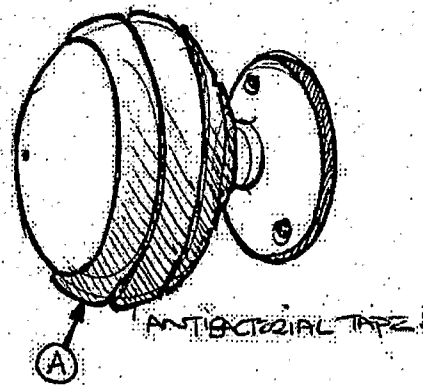


FIGURE 9:

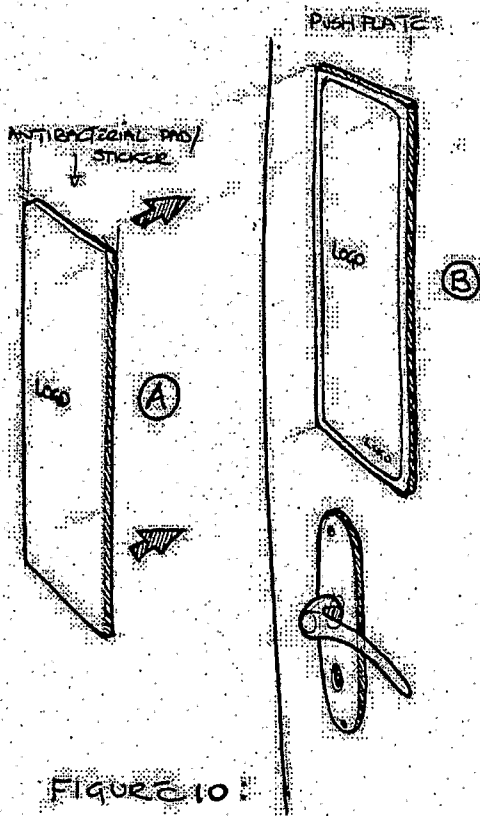


FIGURE 10

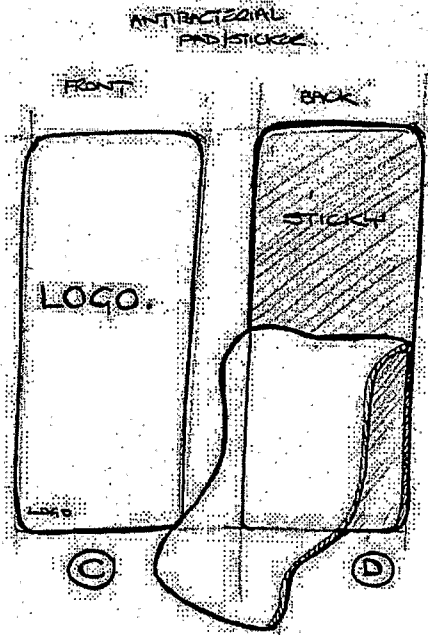


FIGURE 11

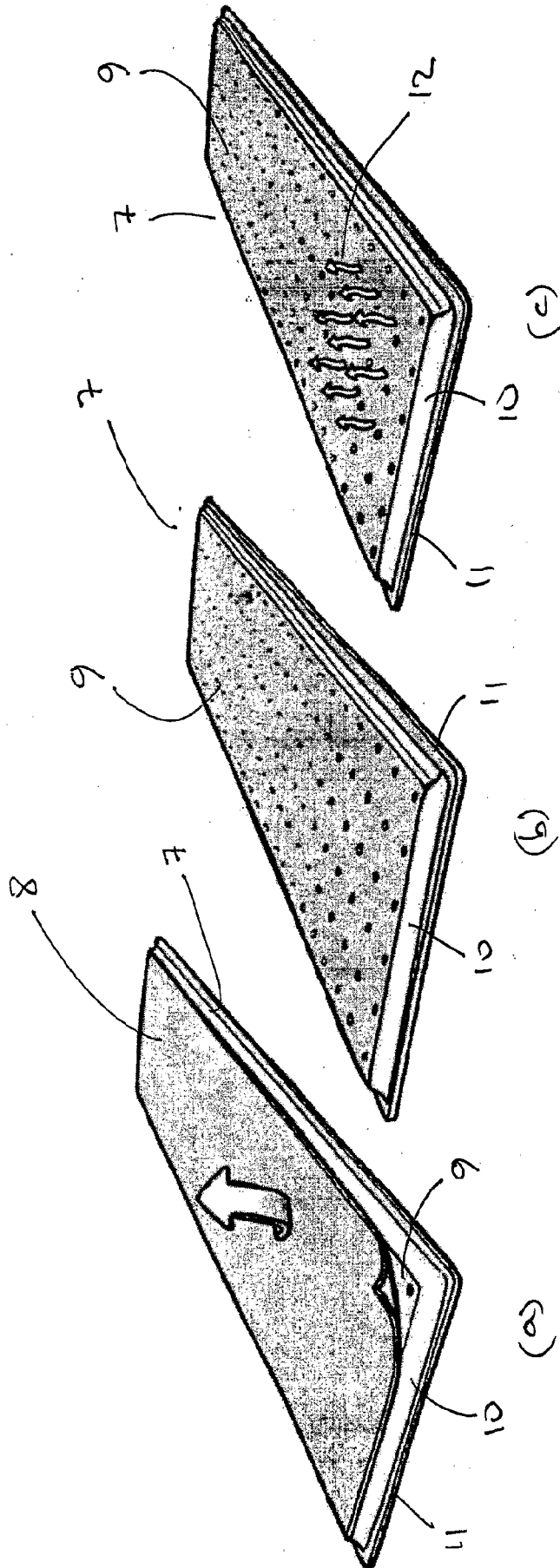


Fig. 12

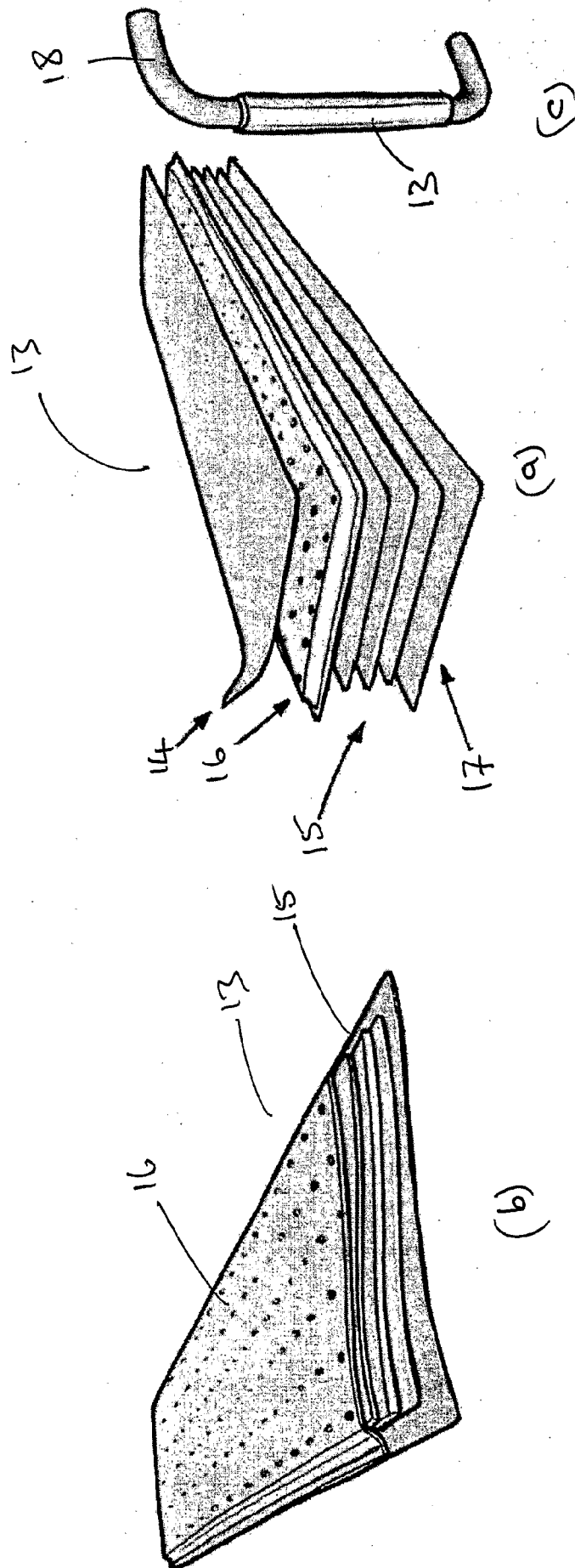


Fig. 13

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2007/001897

A. CLASSIFICATION OF SUBJECT MATTER
INV. B32B5/18 A01N25/34 E05B1/00 A61L2/16

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)
A01N E05B A61K B32B 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)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 30 26 258 A1 (WAGSCHAL GMBH & CO KG FEINMECH [DE]) 28 January 1982 (1982-01-28) claims 1,3,4,8,12 figure 1 page 11, lines 5-11 ----- -/--	1,4-8, 23,24, 27,28, 30,31, 37-40, 42-46, 50-53, 56,60, 66,67

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *Z* document member of the same patent family

Date of the actual completion of the international search

19 September 2007

Date of mailing of the international search report

28/09/2007

Name and mailing address of the ISA/
European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Somerville, Fiona

INTERNATIONAL SEARCH REPORT

International application No

PCT/GB2007/001897

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/041824 A1 (DAWSON PAUL WESLEY [CA] ET AL DAWSON PAUL WESLEY [CA] ET AL) 11 April 2002 (2002-04-11) abstract figure 4 paragraphs [0017], [0019], [0020]	1,4,7,8, 16,17, 19, 23-25, 34, 37-40, 43-45, 50-52, 60,66,67
X	US 4 832 942 A (CRACE ROBERT L [US]) 23 May 1989 (1989-05-23) claims column 3, lines 62-65	1-3,5-8, 16,17, 19, 23-25, 27,28, 30,31, 33,34, 37-40, 43-45, 50-52, 56-58, 60,66,67
X	DE 203 10 052 U1 (HEIDECK BETTINA [DE]) 2 October 2003 (2003-10-02) claims page 1	1,7,17, 19,23, 27,30, 37-40, 43-45, 50-52, 60,66,67
X	DE 101 58 286 A1 (DEHN MICHAEL C [DE]) 28 November 2002 (2002-11-28) figure 1 claims paragraphs [0014], [0019], [0051] -/--	1,2,4,7, 23,27, 30,31, 37-40, 43-45, 50-52, 60-62, 64,66,67

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2007/001897

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/203015 A1 (ALEDO MARIA APARECIDA DE CARVA [BR] ET AL) 30 October 2003 (2003-10-30) claims figure 6 paragraphs [0048] - [0050], [0069], [0070], [0075], [0076], [0091] -----	1,2,4-8, 16,17, 19,20, 23-28, 30,31, 34, 37-40, 42-46, 50-52, 56-58, 60,66,67

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2007/001897

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 3026258	A1	28-01-1982	NONE
US 2002041824	A1	11-04-2002	NONE
US 4832942	A	23-05-1989	NONE
DE 20310052	U1	02-10-2003	DE 20211298 U1 05-12-2002
DE 10158286	A1	28-11-2002	NONE
US 2003203015	A1	30-10-2003	NONE