



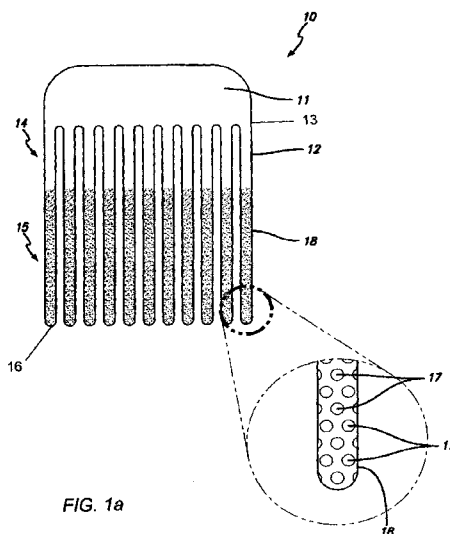
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(54) Title: APPARATUS AND METHOD FOR THE CONTROLLED DELIVERY OF AGENTS



(57) Abstract: An apparatus and method for delivery of agents, in a particular embodiment to the skin or hair, which apparatus and method employs one or more tines which have a distal end made of a carrier material mixed with the agent(s) to be delivered and which mixture is transferrable by friction when the tine(s) is/are drawn along a surface such as the skin or through the hair. The carrier material in one embodiment is wax and in other embodiments can also be cellulose based, starch based or other carbohydrate based material.



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
PCT APPLICATION

TITLE:

APPARATUS AND METHOD FOR THE CONTROLLED DELIVERY OF AGENTS

FIELD OF THE INVENTION

This invention relates to apparatus and methods for the delivery of beneficial agents onto or into the skin or the hair.

BACKGROUND

A number of combs and brushes are known to deliver a medication to skin surfaces. They are combs with hollow interior chambers in a backbone that holds a liquid medication and tines that are hollow allowing for the liquid to pass through tines either in a comb or amongst the bristles of a brush. These combs and brushes carry the risk of self contamination due to spillage, contamination of the environment, less control over dosage as it is affected by size of hole and temperature and the majority, if any, are not biodegradable. Prior art devices have been liquid dispensing devices.

Uniform delivery of the medications or concoctions has not been found to be effectively controlled by prior art devices. In some, the liquid merely flows out of openings in a comb at a rate determined by the size of the openings and characteristics, such as viscosity of the liquid, under the influence of gravity. Others utilize pressure at a reservoir where the liquid is applied periodically by a squeeze bulb or continuously from an external source supplying liquid through a tube or hose. Some comb like devices involved complicated valves and other controls which fail and impair the operation of the comb, making them less than satisfactory.

The primary problem with prior known dispensing devices in the form of a comb is that the flow of the liquid through the teeth and onto the scalp, by its nature, depended

upon gravitational forces present when the comb (or brush) is used or upon pressure in the reservoir.

Such prior devices do not allow effective application of a liquid or medication to areas of, for example, an animal in which the comb or brush would not be held in an upright position, for example, in grooming the underside of the animal. When the devices were held in an upside-down or sideways position, liquid dispensing would be impacted by gravity and a lack of uniform delivery would be the consequence. Most of the liquid flowed within the chamber to the backbone of the comb so that a non-uniform delivery of liquid with medications (example flea applications) occurs with less than an ideal amount of medication being applied to the animal.

Also a major problem with dispensing devices heretofore known is that the flow of the liquid is generally not uniform onto the receiving surface. In US Patent No. 4,057,091 for example, a "metered" liquid flow was determined primarily by gravity so that the liquid application is maximized for areas in which the comb teeth are pointed essentially downwardly, but flow is zero in areas in which the comb teeth must be pointed upwardly to reach the application area.

US Patent No. 2,170,550 shows a comb utilizing absorbent pads in the tips of its teeth which serve to apply the liquid directly to a scalp. A cover, air-locks the liquid within the backbone and teeth of the comb to prevent the liquid from pouring out through the teeth tips at an uncontrolled speed by means of capillary action of the pads. However, this device does not obviate the problem of the need for continuance of the flow of the liquid when the device is utilized in a non-upright position. When this device is held in an upside-down or sideways position, the liquid would not reach the absorbent pads in the tips of the teeth in order for the liquid to be dispensed.

Often it is desired to apply liquid to the length of hairs as well as to the scalp. Devices heretofore known have not been entirely successful in accomplishing this result. Previous attempts to produce a comb which would perform regardless of orientation are described in US Patent No. 2,376,065 where a bulb in the handle is required and US Patent No. 3,754,577 where the liquid is supplied from an extended hose. The attempts to apply medication grooming aids or cleansing agents have been the subject of many patents all of which have been unsatisfactory in one respect or another.

SUMMARY

In accordance with the principles of this invention, a dispensing device is provided which has one or more functional agents embedded within a carrier material of the dispenser and which delivers those agents to or into a skin surface at a rate controlled by the rate at which the material of the dispenser is transferred by friction to the subject's skin. Generally the carrier material is wax based, with options for various amendments to control hardness and response to temperature after application to the skin. For example, the addition of candelilla to harden without increasing the melting point. The agents can be therapeutic, inoculant, dermal treatment and/or cosmetic in nature. In one embodiment, the agents are embedded in the distal portion of the tines of a comb-type structure. It has a hand-holding portion from which the tines extend. The entire device can be made of a wax based material, while tines contain near the tine tips a transfer portion which is specially formulated. The transfer portion contains the agent(s) intended for delivery to the skin within a mixture having a specially formulated wax-based carrier. The wax based carrier is formulated to be readily transferable to the skin upon stroking and also to soften and become less viscose from exposure to the animal temperature such as the human normal 98.6 Fahrenheit, especially as it is deposited on the skin surface. The tines are made of a material such as paraffin and optionally mixed with selected additional types of waxes or oils to adjust its kinetic parameters for the use in this invention. It may be mixed with a wax ester or oil which will soften (decrease its hardness) and thereby allow the agent(s) to be readily available for absorption into the skin such that the tips of the tines are worn down more readily when moved in abutment against a skin surface. As the tine distal end is worn down by friction and the material is transferred to the skin surface, the embedded agents are released. One exemplary agent is minoxidil which is transferred as part of the mixture and available for absorption to the skin to promote hair growth.

The invention can be implemented using cellulose rather than wax to construct the device and in particular for the mixture portion of the tines that is intended to be transferred by friction and to release the agent(s). Also, for those purposes starch based materials and other carbohydrate materials can be similarly used

BRIEF DESCRIPTION OF THE DRAWINGS

Figs. 1a and 1b are a comb-type form of the invention showing alternative transfer portions.

Fig 2 is another example of comb-type device in accordance with the principles of this invention;

Fig. 3 is a schematic representation of a mitt with a palm surface in accordance with the principles of this invention; and,

Fig. 4 is a flow diagram of the method of this invention.

Fig. 5 is a condom having a tine strip in which the tines contain an agent which may include an inoculant and an abrading material or it may contain some other agent.

Fig. 6 is a glove having a tine strip on one finger in which the tines contain an agent which may include an inoculant and an abrading material or it may contain some other agent.

Fig. 7 is a form of the invention having a single tine.

DETAILED DESCRIPTION OF THE INVENTION

The present invention can be defined as an apparatus or device, as a process for making an apparatus, as a process for using an apparatus made by a process and as a manufacture.

The invention derives from the realization that there is a need for a way to conveniently deposit measured amounts of skin and body active agents with a regulated movement in the skin area to be treated and with a carrier material that can hold the agent in storage but when used allows its convenient delivery of the agent(s).

Embodiments of the invention comprise tines that have length from an upper end and ending in a distal end. From the distal end toward the upper end a selected length of the tine is configured as a mixture of a base material (which may be called a carrier material) and an agent, and is defined below as a friction transferable medium. The base material is selected to transfer by friction when drawn in abutment along the treatment subject which may be animal skin or hair. In one embodiment, the base material is selected to soften when subjected to the heat of animal skin, and to reduce in viscosity so as to both make the transfer process easier and more reliable, but also to enhance release

of the agent materials.

Thus transfer due to the friction will transfer both the carrier material and the agent material to the skin wearing away that portion of the tines. Details are given below for exemplary embodiments of carrier materials and agents for various purposes. In this process the tines will shorten as the transfer occurs.

In an embodiment, an amount of agent can be specified by the length of the portion of the tines from the distal end upward that contains the agent.

In another embodiment, the mixture can contain an abrading material that will abrade the skin. Such embodiments can be made with an inoculant as the agent so that the abrading will allow the inoculation procedure to be effected.

A typical comb shape for tines can be made as described below. Also, the tines can be configured as part of a glove or mitt. Also, the tines can be made part of a finger condom, such as by a tine strip attached to or otherwise part of the finger condom. Also, a tine strip can be placed on the finger of a glove or mitt.

The particular agent can be from the group of agents used for cosmetic or skin conditioning, from the group for skin therapy purposes and from the group for inoculation purposes.

In use the product should be kept in a cool environment such as a refrigerator so as to avoid inadvertent softening or melting if the ambient temperature exceeds the melting point. Some agents will, in any case require refrigeration to preserve their effectiveness.

In a further embodiment, the tines could be coated with a material that will protect the carrier and agent materials inside. Exemplary of such a coating is a water soluble starch. In such case the coating can be removed at the tip of the tine by friction on the skin or by friction on a rough material or by dipping the tines in water that will allow for dissolving of the water soluble starch. A coating can have a thickness of from 100 nanometers or above. Exemplary coating materials can be plant starches and fibers and microcrystalline cellulose. In the use of a coating for protecting the interior of the tines,

the mixture inside would not be dissolved during the process of immersing the apparatus in water to remove the coating.

The following definitions are helpful.

Tine: A rigid extended member such as the tines of a comb or the bristles of a brush, which maintains its structural integrity as it is being used.

Base member: A structure having a form that allows it to be hand-held for use and providing one or more tines. In one embodiment the base member is wax based. The base member can also be made of a cellulose-based material, a starch based material and other carbohydrate materials; as well as other materials as described herein.

Agent or active agent: Any useful ingredient or material that is desired to be delivered including without limitation therapeutic, topological, inoculant or internalizable material. In one embodiment materials to be transferred to the skin and/or hair are described. A variety of other materials for a variety of uses are also described herein.

Friction transferable medium or carrier; a material used in a mixture with other ingredients, in particular agent(s) to formulate an active mixture, the function being to contain and transport the agent(s) and allow the agent(s) to be available for their functional use by frictional transfer to a delivery surface.. In one embodiment it is a wax-based material or mixture of such materials, also called a wax base material formulated to be mixed with one or more agents and other materials included to become the active mixture and the function of which is to contain and transport the agents and allow the agents to be available for their functional use by frictional transfer to a delivery surface. It can also be a cellulose-based material a starch based material and/or other carbohydrate materials. Other materials as described herein can also comprise the friction transfer medium/carrier.

Amending materials: materials whose purpose is to cause adjustment to properties of the active mixture relevant to its being stored ready for use and in use, primarily but not exclusively as an amendment to the kinetic properties of the friction transferable medium.

Active mixture: a formulation of materials that will be transferred including, but not limited to, at least a friction transferable medium (or carrier), and at least one agent.

Figs. 1a and 1b show two applicators accordance with the principles of this

invention. The two combs are similar except as will be described below.

Fig 1a has the delivery portion extending a substantial portion of the length of the tines while Fig. 1b has the delivery portion extending only a small distance from the distal end of the tines defining a single or a fixed number of treatments.

In Fig. 1a an applicator 10, in the general shape of a comb comprises a base member 11. The base member 11 is substantially structurally rigid sufficiently that it can be hand held while the applicator is in use. A plurality of tines 12 extend from the base member 11. The tines 12 have a distal end 16 and an upper end 13. Each of the tines 12 illustratively is divided into two areas 14 and 15 as shown. Areas 14 are conveniently made of the same material as the base member 11 comprising a base wax. Area 15, on the other hand, is an active mixture as defined above, having a friction transferable medium made of the same base wax material as the base member 11 or a different base wax material, but also including any selected wax amending materials, and embedded agent material in accordance with the principles of this invention. The active mixture comprises the structure of the tines 12 extending from the distal end 16 a selected distance toward the upper end 13 of the tines 12.

The embedded agent material 17 is illustrated, in the enlarged view, for a tine 18. In the embodiment of Fig. 1a, the mixture of the area 15 extends a selected portion of the tine to provide a use allowed at the user's discretion, and can allow a number of applications, it is not necessarily constructed for a specified course of use and may extend for example up to 5 or even 10 cm, subject to being able to hold its shape when used..

In the embodiment of Fig. 1b the area 15b containing the active mixture extends a selected distance from the distal end 16 of the tine 12 to respond to a single or a fixed number of treatments. It is considered that an exemplary range of the length of the area 15b will be in the range of 1 mm to 1 cm. For example, a 1mm dosage may permit just a single stroke of application and a 1 cm dosage may allow a plurality of strokes which can define either a single dose or a specific limited number of doses.

Although the configuration of Figs. 1a and 1b have the distal ends 16 of the tines 12 arranged in straight line, it can be appreciated that a curvature can be implemented for the distal ends 16.

The embodiments of Figs. 1 and 1a are particularly useful for multiple or single

use applications such as delivering monoxidil to the scalp and may be made quite inexpensively and disposable.

In the embodiment of Fig. 2, an applicator 20 configured as a comb is shown with base member 21 with a single row or plurality of rows of tines 23. In this embodiment, the tine distal ends define a continuous curvature. The tines 23 are shown with two distinct areas 24 and 25, close to and spaced apart from the base member 21, respectively. The tine segments in the area 25 contain the deliverable agent and may contain a color different from that of area 24 to provide an indication of the amount of wear and that a new applicator is required. The embodiments of the type shown in Fig. 2 may have multiple rows of tines.

Fig. 3 shows a third embodiment 30 of the invention. Specifically, Fig. 3 shows a glove (or mitt) 31 having a palm area 32. In accordance with the principles of this invention, the palm area includes a pattern of tines constituting, in aggregate, a roughened area 33 illustrated in the magnified image 35 as tines 36. The roughened area 33 can be made as a single integral part of the mitt, or it can be made as a separate part and assembled to the mitt by adhesion or by heat molding into the combined product.

In the embodiment of Fig. 3, the mitt or glove, of course, is not structurally rigid as is the case in embodiments of the type shown in Figs. 1a and 1b. Moreover, the tines in embodiments of the type shown in Fig. 3 are considerably shorter than those shown in Fig. 1, on the order of up to 1/2 cm to 1 cm, although they can be less. But in both types of embodiments, the deliverable mixture contains agent materials and the tines are structured so as to transfer the mixture when moved in abutment with a surface in order to release the embedded agents.

In each instance, the concentration and distribution of embedded agents in the tines as well as the rate at which the mixture is worn down as it is stroked for delivery determines the amount of embedded agent delivered to or into a surface.

Embodiments of a type shown in Figs. 1, 2 and 3 are usable for applying an agent to a skin surface in a variety of applications.

Embodiments of materials used for the base member, wax amending materials and the agent materials for specific uses are shown in Table 1. Table 1 list in column 1 the type of carrier (comb and/or mitt), and the base wax and wax amendments; in column

2, the embedded agent(s); and in the column 3 specified applications, the contents of columns 2 and 3 being aligned.

In one specific example, a carrier (comb) comprises a base wax of paraffin amended with candelilla with fine portions of a mixture of paraffin, candelilla, beeswax and Jojoba. The distal portion of the tines, illustratively, has a uniform distribution of Minoxidil therein. The Minoxidil conveniently is mixed into the tine material and the comb material is molded into the configuration shown in Fig. 1. The Minoxidil which is useful for treating hair loss is delivered to a human scalp in a controlled manner merely by stroking the comb against the scalp which transfers the mixture to the scalp. The comb in this instance is a single use comb as shown in Fig. 1. Alternatively, the fine lower portions having the active mixture may as a part of the active mixture have wax amendments of sodium hydroxide and fat oil with embedded DEET useful for delivering flea, mosquito or tick repellent and/or insecticides to animals.

Embodiments of the type described also have a variety of other applications depending on the tine material and embedded agent: Table 1, for example, shows one example with a latex or cotton mitt (or glove) with a palm area of tines comprised of paraffin wax or glycerin with any one of a variety of embedded agents such as Progestin, Estrogen, Testosterone, hormones or artificial hormones such as wild yam extracts, for hormonal therapy, PMS - - etc. Other possible embedded agents include antibacterial agents such as silver nitrate and skin bleaching agents. Also, Zinc is useful for corrosion retardation and Neem for delivering dermal ointments and compounds, or skin treatment prior to laser exposure, and plant surface treatment.

The mitt of the type shown in Fig. 3 is particularly useful to desensitize people against allergic reactions. Desensitization (or immunotherapy) currently occurs in the form of allergy shots to desensitize the body to the allergen. In the case of ragweed pollen, for example, small amounts of the allergen are given in minute doses over a long period of time. The desensitizing process requires a number of physician office visits and waiting there for up to an hour each time to assure that no anaphylactic reaction occurs. Once injected, the allergen cannot be removed and could require hospitalization if such a reaction does occur. The use of a mitt in accordance with the principles of this invention, allows for only a tiny amount of the allergen to be embedded in the tines.

When the mitt is rubbed against a body, any allergen remaining on the skin can be rubbed off immediately thereby ridding the patient of the allergen at a much faster rate. The result is that the allergen may be delivered more frequently and at a much more efficacious rate and in a manner (to even include an antidote) which allows any adverse reaction to be well controlled and most likely avoided altogether.

In all instances, in accordance with the principles of this invention, an active mixture is selected which is rigid, or at least self supporting, and which when stroked along the skin will be transferred to the skin by friction. In some mixtures, it will soften and/or become less viscous as it is heated to about body temperature which heating may enhance the release of the agent(s) from the mixture, depositing it on the skin.

An abrasive material can be in the active mixture to abrade the skin, which will enhance the absorption of the agent(s) into the skin.

The process of the invention is described in one embodiment in Fig. 4. The process starts with preparation of the two mixtures, the active mixture containing the agent(s) and the base member mixture, as indicated by block 40 in Fig. 4. Then, the two mixtures are molded into a form of the nature described above, as in block 42. That results in the product being ready for use. Line 44 indicates the end of the manufacturing process above it. The use of the product is indicated at block 46.

It is to be noted that the "tines" in the application shown in Figs. 1 and 2 are considerably different from those in Fig. 3. The tines in Figs. 1 and 2 are relatively elongated where the distal ends of the tines are worn down by friction as it is moved in abutment with a skin surface and the material of the active mixture is transferred. The tines in the embodiments of the type shown in Fig. 3 are relatively short and arranged in a brush configuration. In addition, the tine pattern of Fig. 3, conveniently, is molded separately and, for example, heat secured to the palm of a mitt or glove. Further, the tine pattern may be defined on a strip which could come in rolls with an adhesive backing employing a release paper to ease separation of selected strip lengths.

In another embodiment of the invention, a finger condom or glove with a tine strip attached at the distal end of the first digit with tines that have shard particles embedded such as Neem, pumice or silica and include inoculants such as virus particles, attenuated viruses and allergens can be used to allow for the abrading of buccal and nasal

mucosa thereby delivering an immunization or inoculants to a human or animal. A mitt with the tines attached may be used to rub the inside area of the wrist to allow for the delivery of allergens allowing for allergy therapies. This is shown in Fig. 5 in which a finger condom 52 is worn on the user's hand 50 with a formation of tines 54.

Another form is shown in Fig. 6 in which a strip 62 from which tines 64 extend has an adhesive reverse side which adheres it to the user's hand 60. Both of the forms of Figs. 5 and 6 allow for the uses described herein. Tines 54 extend from the strip 52

These forms in Figs. 5 and 6 allow for the user to self-inoculate. This method could be packaged in a lightweight manner and include instructions for use in the language of choice which then can be air dropped into remote inaccessible areas that possess no roads or air landing strip. It eliminates the risk to humans who otherwise need to have physical access to those who need inoculating and can be used in areas that have been devastated by natural disasters.

As will be apparent from the foregoing, the tines are constructed of a friction transferable mixture that has a carrier or base material that provides structural integrity of the mixture sufficiently to allow it to be stroked along the skin and transfer to the skin. In other applications, there will be abrading materials such as shard particles in the mix with the carrier, in which case the abrading material will abrade the skin thereby facilitating absorption of the agent(s).

Fig. 7 is a form of the device having a single tine. It has a base member 74, which is shaped for convenient hand holding and from which a tine 70 extends. The tine 70 has a distal end 76 and an upper end 72. The active mixture 78 is in the tine 70 extending from the distal end 76 a selected distance toward the upper end 72. As described above the extent of the active mixture can be a selected limited distance for a single dosage or for a set series of dosages.

The invention as described above can also be used for delivery of agents to hair or fur which is accomplished by running the tines through the hair or fur.

TABLE I

1	2	3
Carrier (Comb &/or Mitt) and substances	Embedded Agent(s)	Application(s)
Physical form: Comb Base wax: Paraffin optionally beeswax Wax amendments: wax esters, cellulose esters, sodium hydroxide and fat/oil in a comb	Minoxidil DEET	Hair Loss Prevention Pesticide and repellent for insects e.g., fleas, mosquitoes and ticks.
Physical form: Latex or cotton mitt with palm area of tines. Base wax: paraffin	Progesterin, Estrogen, Testosterone Hormones, artificial Hormone replacements, e.g., Wild Yam extracts. Antibacterial such as silver nitrate; skin bleaching agents. Zinc Neem	(HRT) Hormonal Therapy e.g. To Treat PMS herbal remedies. Dermal ointments and compounds for use prior to laser treatments. Corrosive Retardation To Deposit on Plant Surfaces (Buds) to kill Aphids by Dehydration and Cellular Death
Physical form: comb or mitt. Base wax: Paraffin Wax amendment: Silica	Attenuated Virus of Similar antigen particles. For example, pollen and mumps	To illicit Immune response/therapy for allergies in humans/Inoculation of humans and animals.
Physical form: Fabric	Alkaline chemicals such as	To dissolve the protein

Mitt with palm area of tines. Base wax: Paraffin	Calcium Thioglycolate and Calcium Hydroxide	structure in hair to allow for easy removal as in depilatory cream
Physical form: Comb Base wax: paraffin. Wax amendments: Sodium hydroxide and Fat.	Pigmented fibers natural or synthetic.	Scalp camouflage for areas where hair is thin.

Wax has a hardness range measured in a variety of ways depending on the particular industry in which it is being applied. For purposes of the present invention a scale of hardness used in the crayon industry is considered applicable. The following is a range of hardness used for crayons:

#00, #0, #1, #2, #3, #4, #5, #6, #7, #7 being the hardest.

For the wax carrier of the active mixture it is considered that a hardness range from #2 to #5 is suited to the requisite hardness needed to be able to draw it along a surface with sufficient pressure to allow transfer and soft enough to deposit a sufficient amount in the transfer.

In addition to making the apparatus from wax it can be made using a cellulose-based material for either or both the base member portion and the active mixture portion. For the same purposes starch based materials and/or other carbohydrates can be used.

In addition to using wax materials in both the base member and the active mixture, other materials can be used. One such embodiment is a cellulose mixture that could have the tips comprising a plant (for example corn) cellulose infused with an agent. An exemplary agent is a fungicide for use on a damp or wet surface.

Further, the invention can have embodiments in a number of other applications for the delivery of useful materials, for the base material of the active mixture and for the material used for the base member. Following are embodiments for such other structures

and uses.

Additional agents and their purposes:

Nanoparticles of metals such as silver to kill bacteria and give odor resistance to tines, gold nanoparticles in tine tips for laser targeting in laser treatments

Other nanoparticles such as crystalline nanoparticles or quantum dots to identify and locate specific cells such as skin cancer cells

Magnetic nanoparticles.

gas releasing nanoparticles such as nitrous oxide for skin staff infections

silicate nanoparticles to provide a moisture barrier.

zinc oxide for UV protection

Semiconductor nanoparticles and nanoparticles that are activated by light, x-ray, and sound frequencies for destruction of specific cells and skin treatments.

Aluminosilicate nanoparticles for the purpose of blood clotting in skin and scalp wounds.

Dissolution-controlled drug delivery systems are characterized by a phase erosion of the polymer carrier that is associated with fast or slow dissolution of the macromolecular chains. The molecular nature of the dissolution phenomenon is relative to the water transport process and the subsequent polymer chain disentanglement that is usually characterized by a snake-like motion of the chain (repetition). The polymer molecular weight, water, polymer and drug diffusion coefficients, equilibrium water concentration in the polymer, and water-polymer interaction parameter can control the mechanism and rate of drug release

Carrier Materials

Polymers and combinations of polymers with and without nanoparticles

Polyethylene,

Polyvinyl chloride,

Polypropylene,
Polystyrene,
Polytetraflouroethelene,
Polyurethane,
Polyacrylamide.

Although the various features of novelty that characterize the invention have been described in terms of certain preferred embodiments, other embodiments will become apparent to those of ordinary skill in the art, in view of the disclosure herein. Accordingly, the present invention is not limited by the recitation of the preferred embodiments, but is instead intended to be defined solely by reference to the appended claims.

CLAIMS

1. An applicator for the delivery of an agent to a surface, said applicator comprising a pattern of tines, each of said tines extending from an upper end to a distal end said tines having a construction comprising an active mixture portion extending a selected distance from the distal end toward the upper end said active mixture portion comprising a friction transferable medium and at least one agent whereby the mixture upon being moved in abutment with a surface will enable it to be transferred by friction allowing its deposit onto the surface.
2. The applicator of claim 1 wherein said agent is selected from agents that are either therapeutic, inoculant, or dermally beneficial to animal skin and whereby the surface is animal skin.
3. The applicator of claim 1 said friction transferable medium having a selected transfer hardness or range of transfer hardness.
4. The applicator of claim 1 further comprising a base member and the tines being attached at their upper end to the base member.
5. The applicator of claim 4 wherein said applicator is made of a wax based material.
6. The applicator of claim 5 wherein said wax based material comprises paraffin.
7. The applicator of claim 4 wherein said applicator is made of a cellulose based material.
8. The applicator of claim 4 wherein said applicator is made of a starch based material.
9. The applicator of claim 4 wherein said applicator is made of a carbohydrate material.
10. The applicator of claim 1 wherein the pattern of the tines has the distal ends of the tines aligned along a straight or continuously curved line.
11. The applicator of claim 1 wherein the friction transferable carrier comprises a wax.

12. The applicator of claim 1 wherein the pattern of the tines is that they are respectively parallel.
13. The applicator of claim 1 wherein the at least one agent comprises minoxidil.
14. The applicator of claim 1 wherein the friction transferable medium has a hardness that is variably softer with increased temperature.
15. The applicator of claim 5 further comprising a base member configured for being hand held and the wax based formulation comprises paraffin and is further formulated for friction transferable medium of the active mixture such it will be enabled to transfer upon drawing across the skin and such that the transferred portion will soften upon exposure to increased temperature.
16. The applicator of claim 15 wherein the wax-based friction transferable medium has a reduced hardness relative to the hardness of the rest of the device by a wax softening element in the active mixture.
17. A process for making an applicator for delivery to a surface of at least one agent comprising:
 - making a set of tines in a selected pattern said tines extending from an upper end to a distal end;
 - making a selected length of each tine from its distal end toward its upper end at least from an active mixture of a friction transferable carrier material comprising at least one agent.
18. The process of claim 17 wherein the friction transferable carrier material has a selected storage hardness to make the mixture self supporting.
19. The process of claim 17 further wherein the friction transferable material has a hardness that is variable to become softer with increased temperature.
20. The process of claim 17 wherein said at least one agent comprises minoxidil.
21. The process of claim 17 wherein said applicator is made of a wax based material.
22. The process of claim 17 wherein said applicator is made of a cellulose based material.
23. The process of claim 17 wherein said friction transferable medium is a wax based material.
24. The process of claim 17 said friction transferable medium having a selected

transfer hardness or range of transfer hardness.

25. The process of claim 17 further comprising a base member and the tines being attached at their upper end to the base member.

26. The process of claim 17 wherein said applicator is made of a starch based material.

27. The process of claim 17 wherein said applicator is made of a carbohydrate material

28. A process for applying at least one agent to a delivery surface comprising:
providing an applicator comprising a pattern of tines, each of said tines extending from an upper end to a distal end said tines having a construction comprising an active mixture portion having at least one agent and extending a selected distance from the distal end toward the upper end;

drawing the pattern of tines along a path in contact with a delivery surface causing transfer of the active mixture to the delivery surface thereby allowing deposit of the at least one agent onto the delivery surface.

29 The process of claim 28 wherein the delivery surface is human skin and at least one agent comprises minoxidil.

30. Apparatus for the delivery of an agent to a surface, said apparatus comprising a base member of a geometry to be hand held and having a first surface, said surface having extending therefrom a pattern of tines, said tines comprising at least in part of a material defining an active mixture which can be worn down from friction when moved in abutment with a surface and said agent therein, said agent being dispersed in said tines in a manner to be deposited to the skin surface as the distal ends of said tines are worn down from friction when moved in abutment with a surface and made of a material which will wear down from friction and be deposited on the surface, releasing said agent.

31. Apparatus as in claim 30 wherein said base member comprises a narrow spine and the tines extend from the spine in a linear arrangement.

32. Apparatus as in claim 31 wherein said base member comprises a mitt having a palm surface, said tines extending from said palm surface in a brush configuration.

33. Apparatus as in claim 31 wherein said active mixture comprises a mixture of candelilla, beeswax and jojoba and has minoxidil embedded therein.

34. A method of providing delivery of an agent by hand comprising:
providing a mitt having a palm area and a portion of the palm area having either a roughened surface or a tined surface impregnated with an agent intended for delivery upon use of the mitt;
applying the mitt on a surface desired to be treated by delivery of the agent using a rubbing motion to cause delivery of the agent to the surface.
35. The method of claim 34 wherein the surface is animal skin and the agent is a therapeutic or inoculant or dermal treatment to the skin or the body.
36. A method of providing delivery of an agent by hand comprising:
providing a finger condom having tines extending therefrom which tines have an agent;
applying the finger condom to the skin or other body surface of an animal and moving it so as to cause the agent to be delivered to the skin or other body surface.
37. A method of providing delivery of an agent by hand comprising:
providing a strip having on one side tines having an agent available for transfer upon rubbing on an intended delivery surface and on the other side an adhesive;
applying the strip to a user's finger by adhesion of the adhesive;
moving the finger over a selected area to receive treatment by the agent.

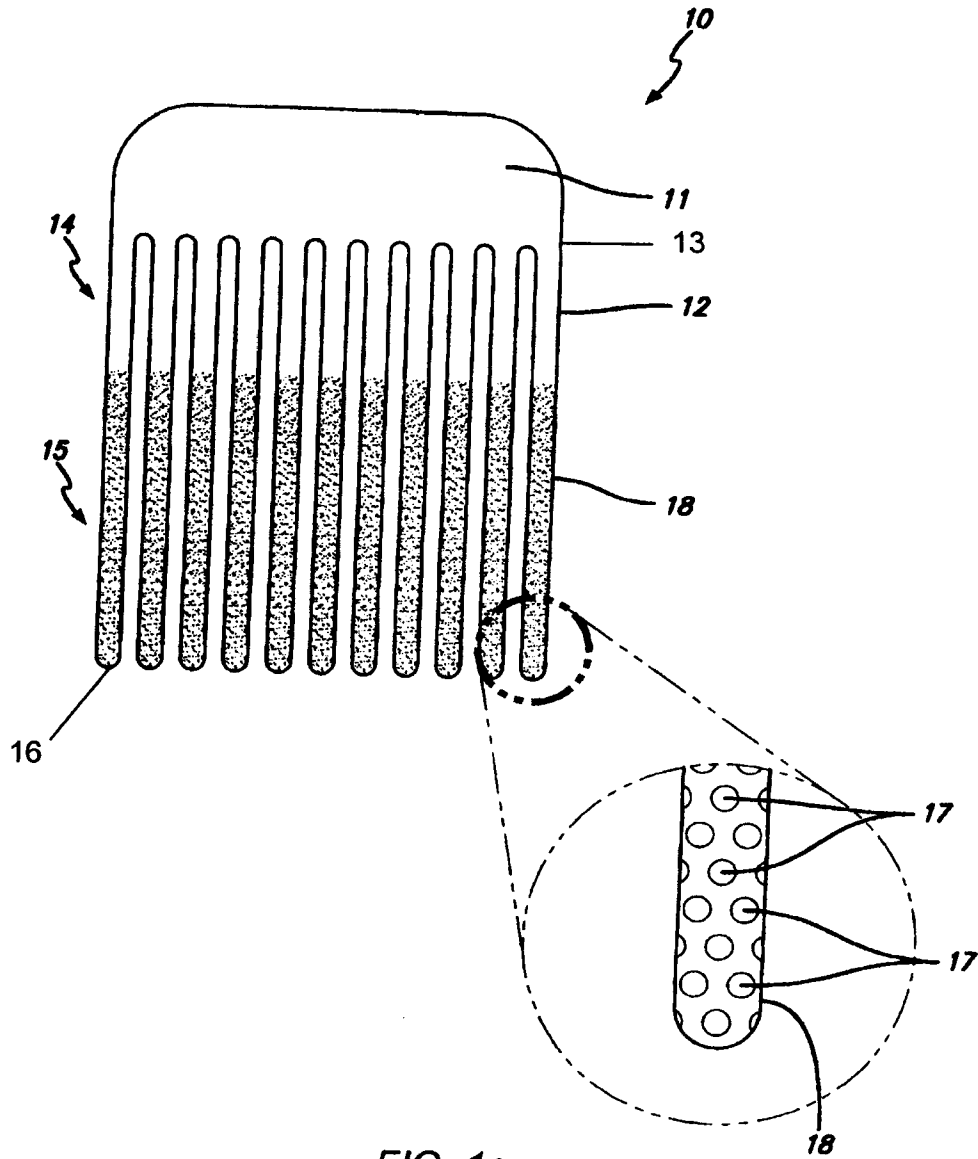


FIG. 1a

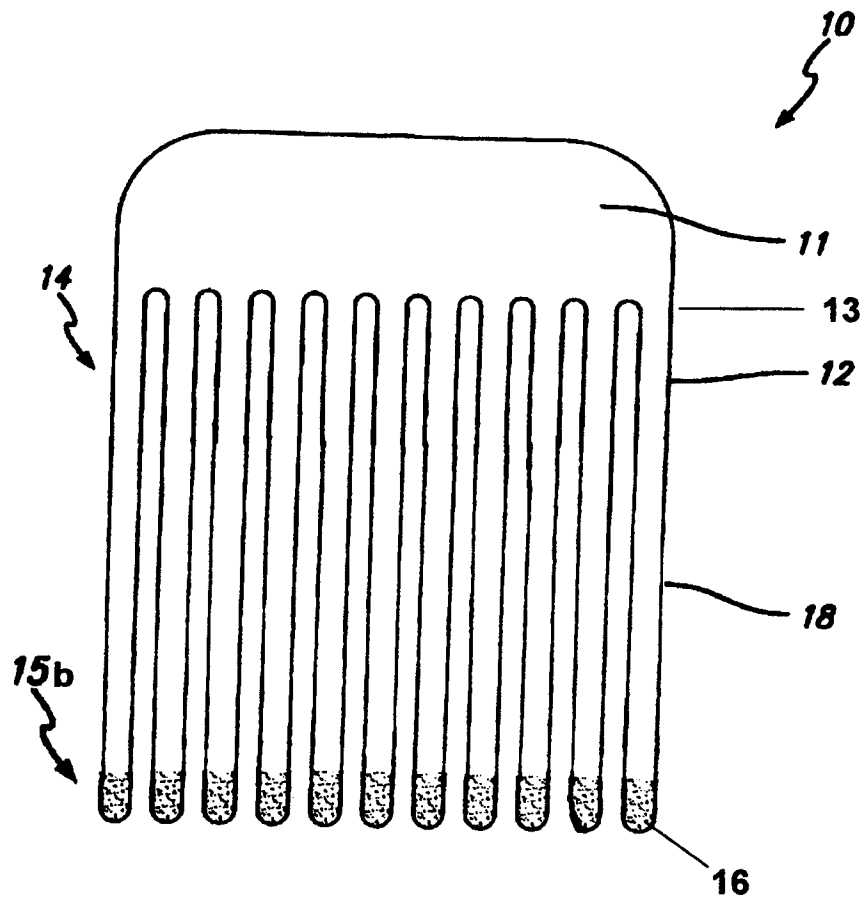


FIG. 1b

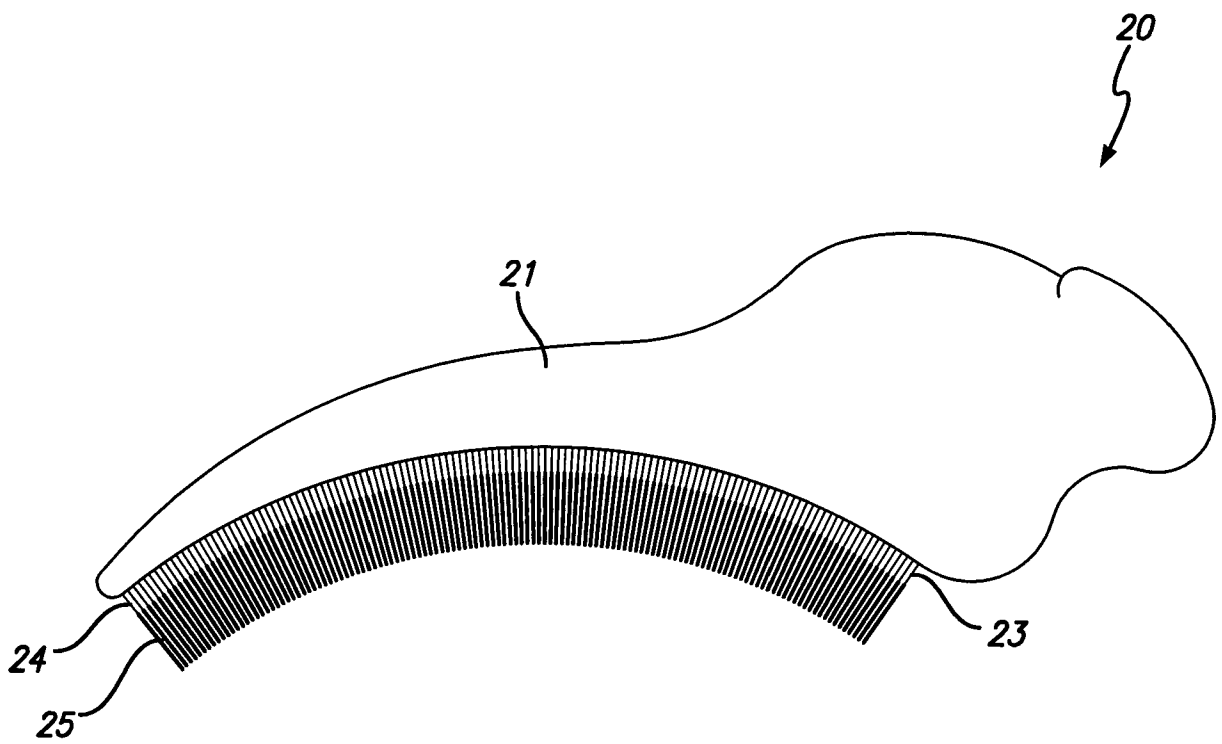


FIG. 2

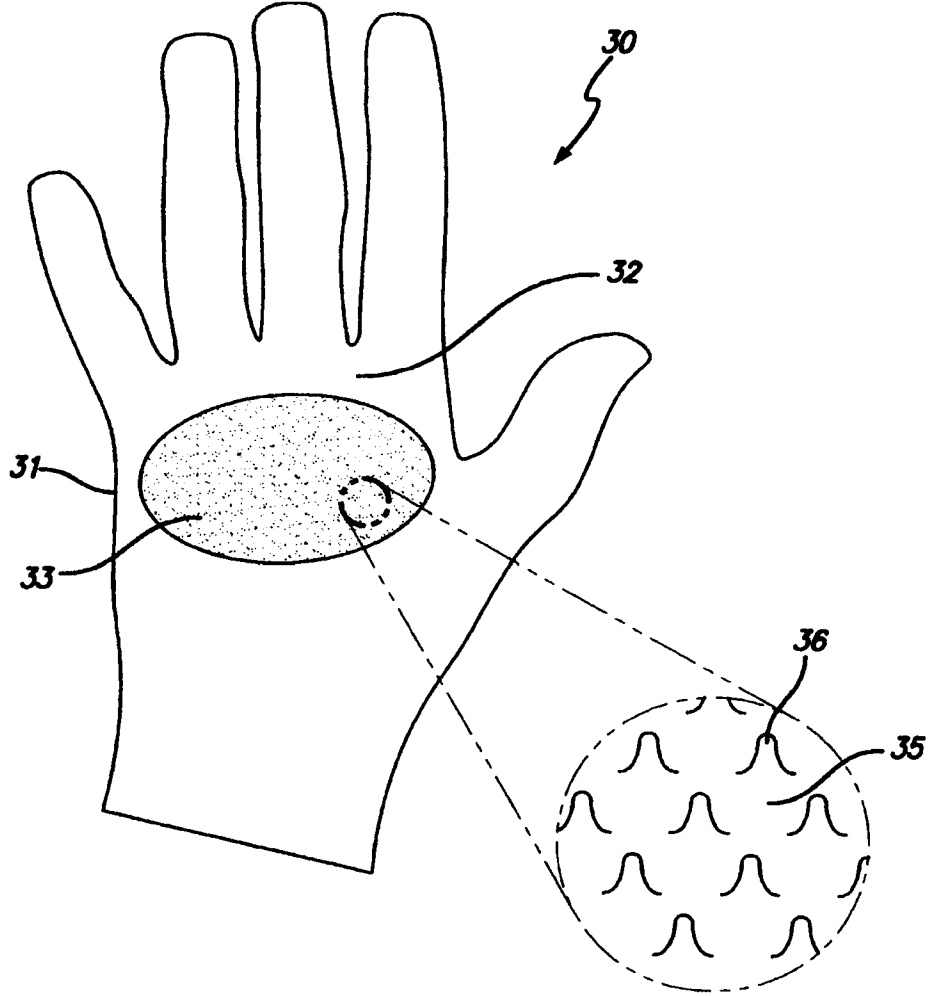


FIG. 3

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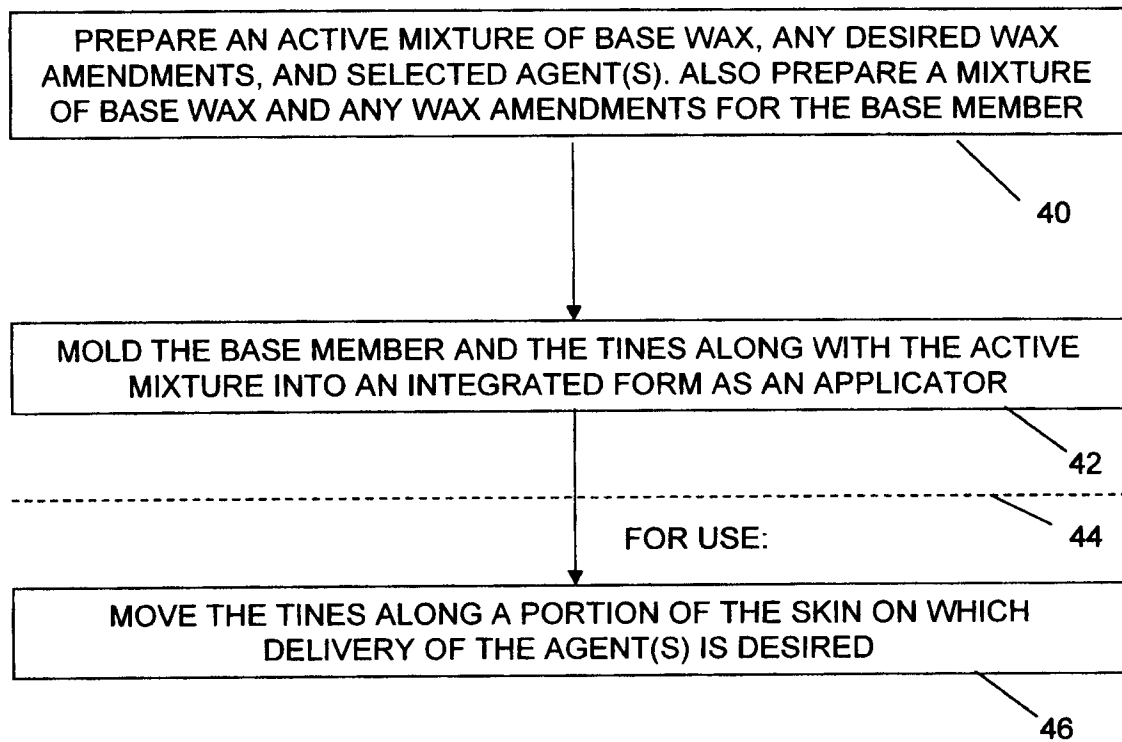


FIG. 4

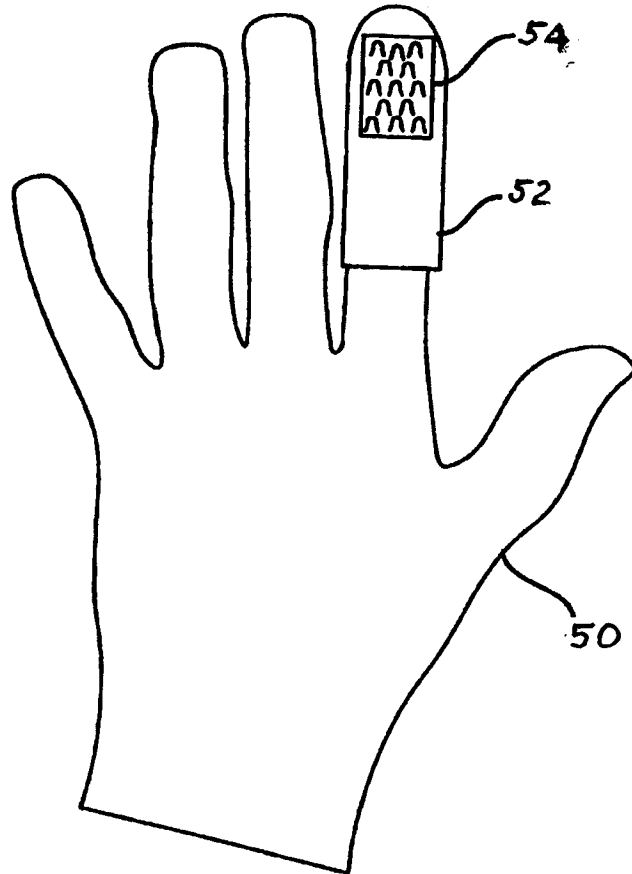


FIG. 5

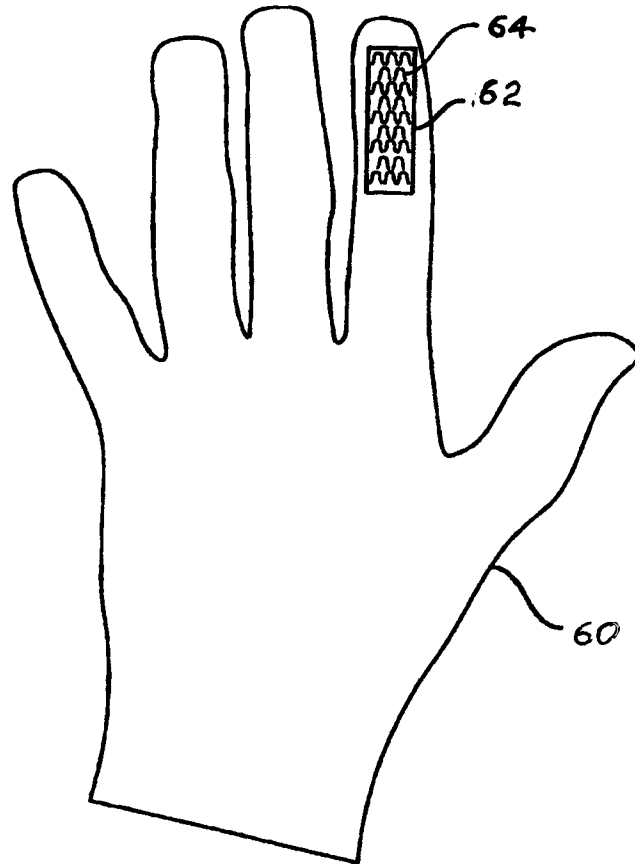


FIG. 6



FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/045945

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - A01K 13/00 (2012.01)
USPC - 132/221
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)
IPC(8) - A01K 13/00, 14/00 (2012.01)
USPC - 119/616; 132/112, 163, 219, 221

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4,862,832 A (METZNER et al) 05 September 1989 (05.09.1989) entire document	1-31, 33
Y		32, 34-36
X	US 5,678,273 A (PORCELLI) 21 October 1997 (21.10.1997) entire document	37
Y	US 5,682,837 A (COURTNEY et al) 04 November 1997 (04.11.1997) entire document	32
Y	US 6,834,619 B1 (RAMPERSAD) 28 December 2004 (28.12.2004) entire document	34-35
Y	US 1,795,500 A (OMUNDSON) 10 March 1931 (10.03.1931) entire document	36

Further documents are listed in the continuation of Box C.

* Special categories of cited documents:	“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
“A” document defining the general state of the art which is not considered to be of particular relevance	“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
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“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)	“&” document member of the same patent family
“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	

Date of the actual completion of the international search 10 September 2012	Date of mailing of the international search report 01 OCT 2012
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