PERSONAL HYGIENE WIPE PACKAGE

Inventor: Tobi W. Ferguson, Lutz, FL (US)

Correspondence Address:
KINNEY & LANGE, P.A.
THE KINNEY & LANGE BUILDING, 312 SOUTH THIRD STREET
MINNEAPOLIS, MN 55415-1002 (US)

Assignee: James A. Donovan, Tarpon Springs, FL (US)

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ABSTRACT

A package for holding personal hygiene wipes. A heater has a pair of packages each having one or more personal hygiene wipes placed against it with the access opening to the wipes faces away from the heater. The heater includes an inner actuation pouch and an outer heat generating pouch. A pressure differential between the outer pouch and the inner pouch causes the activation agent to be thrust into contact with the heat generating material.
FIG. 2
PERSONAL HYGIENE WIPE PACKAGE

BACKGROUND

[0001] This invention relates to a personal hygiene wipe or cloth used to cleanse various parts of the body. More particularly, the invention relates to an improved package for a personal hygiene wipe or cloth that is temperature controlled to give increased comfort and utility.

[0002] Personal hygiene wipes are often used by persons when they are away from their home and do not have access to a shower or bath. They are also used when the part of the person that is to be cleaned is small, and a shower or bath consumes too much time.

[0003] In order to be effective, however, personal hygiene wipes need to be warmed or heating in order to more effectively clean the hands or other parts of the user's anatomy. At the present time, warm wipes are only attainable by the use of an external source of hot water, or by inserting the wipes into a microwave or other heating device. This presents a danger as the degree of heating may vary, and it is possible to have excessive heat applied to the skin.

[0004] It has been suggested that some form of exothermic reaction could be used to generate heat in these products. One such suggestion is to employ a supercooled liquid in a container that can be disturbed by the user at the appropriate time, thus causing an exothermic reaction as the liquid crystallizes. However, because personal hygiene wipes are carried in various purses, brief cases, and other containers, and because they may be subject to forces that are not anticipated, early crystallization of the supercooled liquid causes the wipes to be hot at a time that is not needed.

[0005] Another major drawback of the use of an exothermic reaction to generate heat upon demand is that the various components have to be kept totally separated from each other until they are combined, and when combined need to react quickly and over a reasonable surface area. If the reaction only takes place at one location, excessive heat will be generated. If the reaction components are spread out, there has not been any way to combine them from the dispersed locations to generate uniform exothermic reaction. The problem that occurs is that the heater gives too much heat to part of the object to be heated and too little to other parts.

[0006] Yet another drawback to chemical generation of heat is that at times it is possible for the heat to be too extreme and potentially cause burns or at least discomfort.

[0007] It would be a great advantage if a way of packaging personal hygiene wipes could be developed that have a controlled release of heat that is well within acceptable safety limits.

[0008] Another advantage would be to provide a way of heating personal hygiene wipes that is controlled and requires a specific action by the user, such that the action is not one experienced by the wipes when carried about prior to use.

[0009] Yet another advantage would be to provide a way to generate heat by an exothermic reaction over a personal hygiene wipe sized area quickly, without having to wait for an activation agent to make its way to all the reaction components, and without.

[0010] Still another advantage would be to provide a way to regulate the heat generated by an exothermic reaction over a personal hygiene wipe sized area to provide for initial storage of some of the heat.


SUMMARY

[0012] It has now been discovered that the above and other advantages of the present invention may be accomplished in the following manner. The unique aspect of this invention is that a controlled, dispersed exothermic reaction can be used to warm one or more personal hygiene wipes quickly and effectively.

[0013] In it's simplest form the invention comprises a package for holding personal hygiene wipes. A heater system is provided for generating warming heat over substantially all its surface. A pair of packages each having one or more personal hygiene wipes is placed against the heater system such that each of the access openings to remove one or more wipes faces away from the heater.

[0014] The heater system includes an inner pouch and an outer pouch. The inner pouch includes an actuation agent that is isolated until need. The device has some form of seal that can be broken or opened upon demand. A fragile seal is preferred. The outer pouch contains heat generating materials therein, where the heat generating materials are adapted to generate heat upon activation by the actuation agent. Also provided is a pressure differential between the inner pouch at a lower pressure than the inner pouch so that the actuation agent is thrust into contact with the heat generating material. The outer pouch may have an internal vacuum sufficient to pull the activation agent into said outer pouch upon opening said seal. Alternatively, the inner pouch may have a pressure above atmospheric pressure to accomplish the same rapid activation. In the preferred embodiment, the heat generating materials are crystals that exotherm when contacted with a liquid actuating agent.

[0015] The preferred actuation agent is water and the preferred heat generating material is crystalline calcium oxide. In a preferred embodiment, additional materials such as zeolites may be admixed with the crystals to absorb some of the activating agent for a period of time to increase the length of time the device holds heat.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] FIGS. 1a and 1b are schematic views of a package holding personal hygiene wipes.

[0017] FIG. 2 is a perspective schematic view of the device of this invention being assembled.

[0018] FIG. 3 is a perspective view of the heater element of this invention.

[0019] FIG. 4 is a section view taken along line 4-4 of FIG. 3.

DETAILED DESCRIPTION

[0020] As shown in FIGS. 1a and 1b, a package 11 holds a plurality of personal hygiene wipes of conventional manufacture. Package 11 has a seal 13 on one side and a slot 15 or other opening, such as a peel back closure that can be opened and closed as desired.

[0021] The present invention contemplates the use of two such packages 11a and 11b as shown in FIG. 2 and as described below. It is desirable to provide more than one personal hygiene wipe in each such package. A preferred combination would be four wipes in each pack 11a and 11b, but a “five pack” is also common, where one package such as 11a would have three wipes and the other, such as 11b, would
have two. Any practical number of wipes is contemplated by this invention, for example and not by way of limitation, packs of five or ten or more, and the invention is not limited to any number of wipes. Preferred are those wipes made of spunlace fabric, such as those from rayon and polyester fibers.

[0022] As seen in FIG. 2, wipe packages 11a and 11b are each placed on one side of a heater 17 so that the slot 15 on each is not obstructed by the heater 17, and, preferably, face away from the heater. Heater 17 includes an outer pouch 19 made of a fluid impervious material such as a plastic. Pouch 19 contains the heat generating materials 21 that exotherm when contacted by an actuating agent as described below. Heat generating materials 21 are preferably in crystal or granular form so that they can be spread throughout the inside of pouch 19, thus, when activated, providing exotherm heat that contacts the seal side of the wipe packages 11a and 11b.

[0023] Preferred is an outer pouch 19 made from Aclar®, which is a polychlorotrifluoroethylene (PCTFE) material manufactured and sold by Honeywell International Inc. Aclar film is crystal clear, biochemically inert, chemical-resistant, nonflammable, and plasticizer- and stabilizer-free. Aclar laminates provide a wide range of gauges and thus barrier levels to allow flexibility in selecting the optimum barrier level for the chemical system chosen. Other similar pouched materials may be used as well. All that is required is that the material have a functional moisture and vapor barrier for the other components of the invention.

[0024] As seen in FIGS. 3 and 4, the outer pouch 19 includes an inner pouch 23 positioned inside the outer pouch 19. The inner pouch 23 contains an activation agent 25 that combines with the heat generating materials 21 when the seal 27 separating the contents of inner pouch 23 from outer pouch 19 is opened. Preferably, seal 27 is a frangible seal that can be broken by flexing it. Preferred is an inner pouch 23 made from a heat stamp foil.

[0025] There are a number of combinations of heat generating materials and activating agents that are suitable for use in the present invention. The selection of specific components is to be based upon cost, compatibility, ease of control of the exotherm, and other factors.

[0026] The preferred activating material of this invention is water. This is plentiful and safe, and reacts with a number of materials to produce an exothermic reaction.

[0027] The preferred heat generating material is a material that, when free from moisture, is stable for up to three to five years or more, and which react when moisture is present to generate heat. The preferred crystal is made from crystalline calcium oxide. Calcium oxide is commercially available from a number of sources, one of which being Calcium Oxide Fisher Scientific S79446. For efficient integration of this component into the fabric, the calcium oxide is ground into small particles or crystals and a sieve is used to insure uniform particle size.

[0028] The weight of the heat generating material to the volume of activation agent ranges from about 1:2 to about 1:1, and preferably about 3:4. In the most preferred mixture of the heat generating material is a mixture of calcium oxide with the further addition of a zeolite powder. Preferred is a ratio of calcium oxide to powdered zeolite from about 14 to 20 for calcium oxide and from about 7 to 10 for powdered zeolite.

[0029] Also preferred is the addition of a quantity of crystallized citric acid to control or buffer the pH of the heat generating mixture after activation and also functions as a heat sink to regulate the rate of reaction and to react with the hydrated calcium oxide. The citric acid is also commercially available from a number of sources. One source of citric acid is Sigma Aldrich 201-069-1. Preferred is a ratio of calcium oxide to citric acid to powdered zeolite of 17:1.5:8.5 and the ratio of the solids to the volume of water is about 3:4. Preferred is a ratio of calcium oxide to citric acid to powdered zeolite is from about 14 to 20 for calcium oxide, from about 1 to 2 for citric acid, and from about 7 to 10 for powdered zeolite. Most preferred is a ratio of calcium oxide to citric acid to powdered zeolite is 17:1.5:8.5 and the ratio of the solids to the volume of water is about 3:4.

[0030] More than 150 zeolite types have been synthesized and 48 naturally occurring zeolites are known. They are basically hydrated alumino-silicate minerals with an "open" structure that can accommodate a wide variety of positive ions, such as Na+, K+, Ca2+, Mg2+, and others. These positive ions are rather loosely held and can readily be exchanged for others in a contact solution. Some of the more common mineral zeolites are: analcime, chabazite, heulandite, nattolite, phillipsite, and stilbite. An example mineral formula is: Na2Al4Si6O15·16H2O.

[0031] The heat generating material most preferred, using the above components includes a calcined calcium oxide. This material is available as a small article size, with a diameter less than about 0.2 mm, and as a particle of somewhere between 0.2 and 0.8 mm. Larger particles are ground and smaller ones sieved, and the calcium oxide is then calcined. It has been found to be effective to calcine for at least 60 to 120 minutes, and preferably about 90 minutes, at temperatures above 500° C., and most preferably at about 550° C. for that period of time. The calcined calcium oxide is, of course, desiccated to prevent any contamination by moisture. Laboratory grade citric acid and powdered zeolite are mixed with the calcium oxide in moisture free conditions, in an appropriate reaction ratio to provide the exothermic reaction upon contact by the activating agent water.

[0032] In order to have an uniform and even production of heat from the exotherms, it is preferred that the inside of inner pouch 23 be at atmospheric pressure or 14.7 psi, and the inside of the outer pouch 19 be under vacuum. Preferred pressures in outside pouch 19 are from about 8 psi to about 13 psi, with 10 or 11 psi being preferred. It is necessary to have a pressure differential between the inside of both pouches to be sufficient to pull the activating agent 25 to the entire area where the heat generating material 21 has been placed. Alternatively, the inner pouch can have an increased pressure of from about 17 to 22 psi, and preferably from about 19 to 20 psi. Too little or too great a pressure differential is not desired, for design and reliability reasons.

[0033] In a series of tests of the preferred embodiment as described above, 100% of the activations by bending the packages resulted in warm personal hygiene wipes. Then a similar set of packages were prepared, with the only change being no vacuum inside the outer pouch, only 30% of the wipes achieved the desired temperature.

[0034] In a preferred embodiment, the heat generating material also includes a small quantity of polyalkyl glycol such as polyethylene glycol or similar materials which are used to coat the calcium oxide prior to initiating the exothermic reaction. This small coating, of 1% to 7% polyethylene glycol by weight in the total composition slows down the reaction with water to prolong the heat for over two hours. A preferred weight percent of polyethylene glycol is from 3% to 4%. Tests have been made that kept a container of one liter of
water at a temperature of 140° F. to 165° F. for more than two hours. While this is a long time for a personal hygiene wipe to remain hot, extending the reaction time at least for as long as needed to complete personal hygiene practices is of considerable value.

[0035] It is also an embodiment of the present invention to employ a temperature changing chemical that causes a drop in temperature when contacted by water, creating an endothermic reaction. The solid materials may, for example, include materials such as sodium sulfate, sodium bicarbonate, ammonium nitrate, ammonium chloride, urea, ammonium dichromate, citric acid, potassium perchlorate, potassium sulfate, potassium chloride, calcium nitrate, and vanillin. These solid compounds react with water in an endothermic fashion to impart cooling. Reactions can be with water based mixtures as well as other liquid systems.

[0036] Although the present invention has been described with reference to preferred embodiments, workers skilled in the art will recognize that changes may be made in form and detail without departing from the spirit and scope of the invention.

1. A packaged, heatable personal hygiene wipe device, comprising:
   a first package of personal hygiene wipes having an opening on one surface for removal of the wipes;
   a second package of personal hygiene wipes having an opening on one surface for removal of the wipes;
   a heater positioned between the first and second packages of wipes such that openings on the packages are not obstructed by the heater, the heater comprising:
   an outer pouch sealingly supporting both the first and second packages and having an inner pouch inside it;
   the inner pouch having an actuation agent therein and a seal keeping the actuation agent in the inner pouch;
   the outer pouch having heat generating materials therein, the heat generating materials being adapted to generate heat upon activation by the actuation agent upon breaking the seal keeping the actuation agent in the inner pouch;
   a pressure differential between the pressure in the inner pouch and the outer pouch such that the inner pouch has a higher pressure, whereby, upon breaking the seal keeping the actuation agent in the inner pouch, the activation agent is driven into the outer pouch to activate the heat generating materials.

2. The device of claim 1, wherein the pressure differential is caused by a vacuum inside the outer pouch.

3. The device of claim 2, wherein the amount of vacuum in the outer pouch is sufficient to give a pressure of from about 8 to 13 psi.

4. The device of claim 1, wherein the pressure differential is caused by an elevated pressure inside the inner pouch.

5. The device of claim 1, wherein the actuation agent is water and the heat generating material is crystalline calcium oxide.

6. The device of claim 5, wherein the heat generating material further includes citric acid and powdered zeolite admixed therein and wherein the ratio of calcium oxide to citric acid to powdered zeolite is from about 14 to 20 for calcium oxide, from about 1 to 2 for citric acid, and from about 7 to 10 for powdered zeolite, and the weight of the crystalline calcium oxide to the volume of water ranges from about 1:2 to about 1:1.

7. The device of claim 1, wherein the surface area of the heater in contact with the first and second packages is approximately the same as the surface area of each package.

8. The device of claim 1, wherein the first and second packages are bonded to the heater.

9. The device of claim 8, wherein the bonding is selected from heat sealing, gluing, sonic healing and RF sealing.

10. The device of claim 1, wherein the heat generating material includes a quantity of exotherm delaying material coated thereon to slow down the penetration of the actuation agent.

11. A method for packaging heatable personal hygiene wipe device, comprising the steps of:
   providing a first package of personal hygiene wipes having an opening on one surface for removal of the wipes;
   providing a second package of personal hygiene wipes having an opening on one surface for removal of the wipes;
   placing a heater between the first and second packages of wipes such that openings on the packages is not obstructed by the heater, the heater comprising:
   an outer pouch sealingly supporting both the first and second packages and having an inner pouch inside it;
   the inner pouch having an actuation agent therein and a seal keeping the actuation agent in the inner pouch;
   the outer pouch having heat generating materials therein, the heat generating materials being adapted to generate heat upon activation by the actuation agent upon breaking the seal keeping the actuation agent in the inner pouch;
   a pressure differential between the pressure in the inner pouch and the outer pouch such that the inner pouch has a higher pressure, whereby, upon breaking the seal keeping the actuation agent in the inner pouch, the activation agent is driven into the outer pouch to activate the heat generating materials.

12. The method of claim 11, wherein the pressure differential is caused by a vacuum inside the outer pouch.

13. The method of claim 12, wherein the amount of vacuum in the outer pouch is sufficient to give a pressure of from about 8 to 13 psi.

14. The method of claim 11, wherein the pressure differential is caused by an elevated pressure inside the inner pouch.

15. The method of claim 11, wherein the activation agent is water and the heat generating material is crystalline calcium oxide.

16. The method of claim 15, wherein the heat generating material further includes citric acid and powdered zeolite admixed therein and wherein the ratio of calcium oxide to citric acid to powdered zeolite is from about 14 to 20 for calcium oxide, from about 1 to 2 for citric acid, and from about 7 to 10 for powdered zeolite, and the weight of the crystalline calcium oxide to the volume of water ranges from about 1:2 to about 1:1.

17. The method of claim 11, wherein the surface area of the heater in contact with the first and second packages is approximately the same as the surface area of each package.

18. The method of claim 11, including the step of bonding the first and second packages to the heater.

19. The method of claim 18, wherein the bonding is selected from heat sealing, gluing, sonic healing and RF sealing.

20. The method of claim 11, wherein the heat generating material includes a quantity of exotherm delaying material coated thereon to slow down the penetration of the actuation agent.