

INVALIDATION - SAMPLE

US 6371977



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Objective:

The objective of the project is to conduct an invalidation search for patent number US6371977 referred to as "977" hereinafter, relates to a "Protective Multi-layered liquid retaining composite"

Priority date of "977" patent

This application is a continuation-in-part application of Ser. No. 09/275,194, filed Mar. 23, 1999, by Bumbarger et al., which is a continuation-in-part of patent application Ser. No. 08/947,184 filed Oct. 8, 1997, now U.S. Pat. No. 5,885,912. Therefore, **October 8, 1997**, is taken as the earliest priority date for the search, taking basis of which, the prior arts have been identified.

Understanding and Search Focus:

Claim considered for this invalidation Study:

Claim 9.

A method of cooling a person by evaporation, comprising:
providing a multi-layered, liquid-retaining composite material comprising:
a filler layer comprising:
a fiberfill batting material and
hydrophilic polymeric particles;
soaking said multi-layered, liquid-retaining composite in a liquid; and
employing said multi-layered, liquid-retaining composite as a garment or a flat sheet and evaporatively cooling said person.

Summary of Search Results:

- ❖ Search resulted with three very close patent references and one peripheral reference which are very close to the claim elements of US 6371977 patent.
- ❖ Claim Mapping is done with claim elements Vs relevant excerpts from each reference.
- ❖ All references are hyperlinked. Please click on the reference for complete details
- ❖ Text highlighted is just for your quick reference. Please open the reference for complete information
- ❖ Information for “one member per family” been provided. Please check the Family member section for complete family information

Quick overview of Relevant / Related References:

S. No.	Relevant Patent/ Publication No.	Relevancy	Priority/ Filing Date	Title	Relevant Excerpts
1	US6464672B1	High	14/07/1992	Multilayer composite material and method for evaporative cooling	<i>Para 0004 Para 0015</i>
2	US3429138	High	27/04/1967	Cooling Vest	<i>Col 01: 30-34 Col 03:01-07 Col 01:35-45 Claim 2, 3, and 5</i>
3	US6319599	High	14/07/1992	Phase change thermal control materials, method and apparatus	<i>Col 3: 1 - 5 Col 12:10-18 Claim 14</i>
4	US6125645	Moderately Related	12/06/1997	Moisture removal phase	<i>Col 05: 11-65</i>

				shift personal cooling Garment	Claim 1, 5, and 12
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Claim Mapping:

Elements of Claim 9	Prior Art			
	US6464672	US3429138	US6319599	US6125645
A method of cooling a person by evaporation, comprising:	✓	✓	✓	✓
providing a multi-layered, liquid-retaining composite material comprising: a filler layer comprising: a fiber fill batting material and hydrophilic polymeric particles;	✓	✓	✓	✓
soaking said multi-layered, liquid-retaining composite in a liquid; and	✓	✓	✓	✓
employing said multi-layered, liquid-retaining composite as a garment or a flat sheet and evaporatively cooling said person	✓	✓	✓	✓

✓: Completely disclosing the key feature.

X: Not Disclosing the key feature

References (Patents/Publications):

Result 1:

Patent Application/ Publication No.	Assignee/Inventor(s)	Priority date
US6464672B1	THERESA M BUCKLEY	14/07/1992
Title of the patent application/ publication	Multilayer composite material and method for evaporative cooling	
Family Member(s)	US5722482, US6004662, US6183855, US6319599, US6464672, US2002164474, AU4678293	

Abstract:

A highly flexible composite material (21) having a flexible matrix (B) containing a phase change thermal storage material (20). The composite material can be made to heat or cool the body or to act as a thermal buffer to protect the wearer from changing environmental conditions. The composite (21) may also include an external thermal insulation layer (A) and/or an internal thermal control layer (C) to regulate the rate of heat exchange between the composite (21) and the skin of the wearer. Other embodiments of the PCM composite (21) also provide 1) a path for evaporation or direct absorption of perspiration from the skin of the wearer for improved comfort and thermal control, 2) heat conductive pathways within the material for thermal equalization, 3) surface treatments for improved absorption or rejection of heat by the material, and 4) means for quickly regenerating the thermal storage capacity for reuse of the material. Applications of the composite materials (21) are also described which take advantage of the composite's thermal characteristics. The examples described include a diver's wet suit, ski boot liners, thermal socks, gloves and a face mask for cold weather activities, and a metabolic heating or cooling blanket useful for treating hypothermia or fever patients in a medical setting and therapeutic heating or cooling orthopedic joint supports.

Claim Elements of '977 patent	Relevant excerpts from the Prior Art
A method of cooling a person by evaporation, comprising	<p>Para 0004</p> <p>This invention relates to a multilayer composite material and method for evaporative cooling of a person and to garments and other articles made from the multilayer composite material.</p>
providing a multi-layered, liquid-retaining composite material comprising: a filler layer comprising: a fiberfill batting material and hydrophilic polymeric particles;	<p>Para 0015</p> <p>The evaporative cooling liquid is absorbed into a superabsorbent material enclosed within the multilayer composite material.</p> <p>The multilayer composite material has a high percentage of the evaporative cooling liquid in the matrix. The cooling effect can be sustained for an extended period of time because of the high percentage of phase change liquid that can be absorbed into the superabsorbent.</p>
Soaking said multi-layered composite in a liquid	<p>Para 0015</p> <p>the composite can be made with an impermeous barrier material or semipermeable membrane on one side to prevent the liquid from contacting the person's skin. The evaporative cooling liquid in the matrix can be recharged by soaking the material in the liquid. The multilayer composite material can be fashioned into blankets, garments and other articles.</p>
employing said multi-layered, liquid-retaining composite material as a garment or a flat sheet and evaporatively cooling said person	<p>Para 0015</p> <p>a multilayer composite material and method for evaporative cooling of a person and to garments and other articles made from the multilayer composite material.</p> <p>The multilayer composite material can be fashioned into blankets, garments and other articles</p>

Result 2:

Patent Application/ Publication No.	Assignee/Inventor(s)	Priority date
US3429138	ISAAC GOLDMERSTEIN	27/04/1967
Title of the patent application/ publication	COOLING VEST	
Family Member(s)	None	

Abstract:

A cooling vest formed of a rectangular strip of material shaped to form a wide band body. The band-shaped body is formed of a single rectangular ply of nylon or plastic mesh material on one side thereof and a series of rectangular three-ply strips on the other side thereof. Each strip is formed of an inner ply of thin corrugated metallic foil of highly heat and cold conductive material, a thin outer ply of fabric, and an intermediate ply of absorbent evaporator material such as sponge including a thin band of cotton and cross pieces of sponge placed thereon in crosswise fashion for connecting the sponge pieces together. The three-ply strips are secured at their ends to the ends of the nylon or plastic mesh materia. Detachable fastening means such as perforated straps on one end of the band body and coacting lugs on the other end detachably connect the ends of the band body to each othee. Shoulder straps attached to the topmost three-ply strip support the vest from the shoulders of the wearer.

Claim Elements of '977 patent	Relevant excerpts from the Prior Art
	<i>Col 01: 30- 34</i>

<p>A method of cooling a person by evaporation, comprising</p>	<p>A primary object of the invention is to provide a wide band for encircling the outer garment on a persons body for acting as a cooling agent for the body.</p> <p><i>Col 03:01-07:</i></p> <p>As the temperature of the weather and of the body of the wearer increases the rate of evaporation of the cooling fluid increases. The cooling is directly transferred to the conductive layer 14 and by the layer to the body of the wearer. Likewise heat from the Wearers body is transferred by the conductive layer 14 to the evaporator member 18 for evaporation of the cooling fluid.</p>
<p>providing a multi-layered, liquid-retaining composite material comprising: a filler layer comprising: a fiberfill batting material and hydrophilic polymeric particles;</p>	<p><i>Claim 2:</i></p> <p>A cooling vest for the human body of the kind described as defined in claim 1, said shoulder straps each including a layer of water absorbant material.</p> <p><i>Claim 3:</i></p> <p>A cooling vest for the human body of the kind described as defined in claim 1, wherein the annular strip of water absorbent material is disposed between an inner layer of corrugated metallic foil and an outer layer of thin fabric material, said strip including a thin cotton band and pieces of sponge material across the band and secured thereto, said pieces adapted to fit in the corrugated portions of the layer of metallic foil.</p>
<p>Soaking said multi-layered composite in a liquid</p>	<p><i>Col 01:35-45:</i></p> <p>The '138 patent relates to including theconductive material such as corrugated metallic foil and an outer ply of thin fabric material and an intermediate ply constituting an absorbent evaporator member such as sponge which can be soaked with water or other cooling fluid fir evaporation cooling the strip members adapted to encircle an outer garment on the body of a person</p>
<p>employing said multi-layered, liquid-retaining composite material as a garment or a flat</p>	<p><i>Claim 5</i></p> <p>A cooling vest for the human body of the kind described as defined in claim 4, wherein means for removably supporting the body of the vest on the</p>

<p>sheet and evaporatively cooling said person</p>	<p>shoulders of the wearer is constituted by a pair of shoulder straps secured at their ends at opposite points along the top of the body of the vest, said shoulder straps each including a layer of Water absorbent material and a layer of corrugated metallic foil, and wherein means for holding the strip members in position is constituted by a cover of mesh material secured along the peripheral edges of the top and bottom strip members and along the ends of the strip members.</p>
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Result 3:

Patent Application/ Publication No.	Assignee/Inventor(s)	Priority date
US6319599	Theresa M. Buckley	14/07/1992
Title of the patent application/ publication	Phase change thermal control materials, method and apparatus	
Family Member(s)	AU4678293, US5722482, US6004662, US6183855, US6464672, US2002164473, US2002164474, WO9402257	

Abstract:

An apparatus and method for metabolic cooling and insulation of a user in a cold environment. In its preferred embodiment the apparatus is a highly flexible composite material having a flexible matrix containing a phase change thermal storage material. The apparatus can be made to heat or cool the body or to act as a thermal buffer to protect the wearer from changing environmental conditions. The apparatus may also include an external thermal insulation layer and/or an internal thermal control layer to regulate the rate of heat exchange between the composite and the skin of the wearer. Other embodiments of the apparatus also provide 1) a path for evaporation or direct absorption of perspiration from the skin of the wearer for improved comfort and thermal control, 2) heat conductive pathways within the material for thermal equalization, 3) surface treatments for improved absorption or rejection of heat by the material, and 4) means for quickly regenerating the thermal storage capacity for reuse of the material. Applications of the composite materials are also described which take advantage of the composite's thermal characteristics. The examples described include a diver's wet suit, ski boot liners, thermal socks, gloves and a face mask for cold weather activities, and a metabolic heating

or cooling blanket useful for treating hypothermia or fever patients in a medical setting and therapeutic heating or cooling orthopedic joint supports.

Claim Elements of '977 patent	Relevant excerpts from the Prior Art
A method of cooling a person by evaporation, comprising	<p>Abstract:</p> <p>An apparatus and method for <i>metabolic cooling and insulation of a user in a cold environment. In its preferred embodiment the apparatus is a highly flexible composite material having a flexible matrix containing a phase change thermal storage material.</i></p>
providing a multi-layered, liquid-retaining composite material comprising: a filler layer comprising: a fiberfill batting material and hydrophilic polymeric particles;	<p>Col 3: 1 - 5</p> <p>the present invention provides a composite material that has a phase change material incorporated into a flexible matrix material. In a second embodiment, <i>the composite also includes an external thermal insulation layer and an internal thermal control layer</i> to modify the surface temperature experienced by the skin of the wearer.</p>
Soaking said multi-layered composite in a liquid	<p>Col 12:10-18:</p> <p>The composite can be made with an impermeous barrier material on one side to prevent the liquid from contacting the patient's skin. <i>The phase change liquid in the matrix can be recharged by soaking the material in the liquid. This has an important advantage over the traditional method of using alcohol baths for cooling febrile patients</i> in that the cooling effect can be sustained for an extended period of time because of the high percentage of phase change liquid that can be absorbed into the superabsorbant.</p>
employing said multi-layered, liquid-retaining composite material as a garment or a flat	<p>Col 3: 1 - 5</p> <p>In a second embodiment, the composite also <i>includes an external thermal insulation layer and an internal</i></p>

sheet and evaporatively cooling said person	<p>thermal control layer to modify the surface temperature experienced by the skin of the wearer and the PCM may be chosen to provide heating, cooling or environmental buffering.</p> <p>Claim 14:</p> <p>14. The material of claim 1 wherein said material is fashioned into a garment selected from the group consisting of a wetsuit, a boot, a facial mask, a hat, a gaiter, an ear muff, a liner, a shoe insert, a shoe insole, a seating article, a jacket, trousers, a thermal undergarment and biking shorts</p>
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Result 4:

Patent Application/ Publication No.	Assignee/Inventor(s)	Priority date
US6125645	HORN, STEPHEN T	12/06/1997
Title of the patent application/ publication	Moisture removal phase shift personal cooling Garment	
Family Member(s)	None	

Abstract:

The present invention provides a body cooling garment to easily and effectively protect the human body in hot conditions. By suspending in vapor contact a cold surface with channels in it's surface; moisture is evaporated from the body, condensed on the cold surface, and the body shielded from environmental heat. The condensed moisture is channeled from the garment

Claim Elements of '977 patent	Relevant excerpts from the Prior Art
A method of cooling a person by evaporation, comprising	<p>Claim 1</p> <p>relates a method of cooling the body of a wearer of a cooling garment, said method comprised of the following steps. (See claim 1)</p>
	<p>Claim 5</p>

<p>providing a multi-layered, liquid-retaining composite material comprising: a filler layer comprising: a fiberfill batting material and hydrophilic polymeric particles;</p>	<p>The '645 patent relates a garment having an inside surface being the surface closest to the body of said wearer, said front and rear panels comprising layers, presented here in an order starting with the claimed layer closest to said inside surface as follows: a spacer layer of a vapor permeable hydrophobic material on the inside of a heat absorbing layer having a temperature below the dew point of water with a substantially unrestricted vapor travel between the wearer and the heat absorbing layer and vapor permeable hydrophobic material is synthetic fiber batting.</p>
<p>Soaking said multi-layered composite in a liquid</p>	<p>Col 05: 11-65 an experiment where a double layer of cotton material was soaked in water to represent the skin of a hot individual this was laid on a flat marble slab to maintain a constant temperature. On top of this was placed 3/16 in. layer of polyester batting. Then two electrical sensors, each constructed of a pair of 1/16 in stainless steel rods held 1/16 in apart were laid on the polyester batting</p>
<p>employing said multi-layered, liquid-retaining composite material as a garment or a flat sheet and evaporatively cooling said person</p>	<p>Claim 5 A garment for cooling the body of a wearer fashioned of layered components into a generally rectangular garment having opposite end edges and opposite side edges, said garment having a head opening in a generally central location for accommodating head and neck of said wearer, front and rear panels, defined by said head opening, for overlaying chest and back of said wearer respectively, said garment having an inside surface being the surface closest to the body of said wearer, said front and rear panels comprising layers, presented here in an order starting with the claimed layer closest to said inside surface as follows: a spacer layer of a vapor permeable hydrophobic material on the inside of a heat absorbing layer having a temperature below the dew point of water with a substantially unrestricted vapor travel between the wearer and the heat absorbing layer.</p> <p>Claim 12</p>

12. **The cooling garment** of claim 1 wherein said cold surface is comprised of multiple quilted sections wherein the spaces between the said multiple quilted sections forms substantially vertical channels

Search History:

Databases used for searching:

Patent

- ❖ Thomson Innovation
- ❖ Google patents
- ❖ Espacenet
- ❖ WIPO
- ❖ USPTO

Non-Patent Literature

- ❖ Google scholar
- ❖ Sirus
- ❖ Proquest

Countries Covered: Worldwide

Scope: Full Patent Specification

Years Considered: 18340101-19971008

Keywords:

S. No	Concept	Synonyms /Alternate termsfor the Concept
1	Cooling	Chilling, Temperature
2	Person	Body, Mammal, Animal, Human
3	Layer	Bed, Surface, Stage, Level
4	Multilayer	Composite, Group, Garment, Cloth, Flat sheet, Fabric, Shirt, Jacket, Pant

5	Absorb	Absorb, Super absorb, Retain, Restrain
6	Soak	Soak, Immerse, Drench, Wash, Imbibe
7	Water	Water, Liquid, Aqua
8	Fiber	Fiber, Fiber fill / Batting, Retaining layer, Filler layer, Conductive layer, Protective layer
9	Evaporate	Evaporate, Dissipate, Disperse, Vaporize

Field of Search

Source	Query	Scope	Hits
Thomson Innovation	ALL=(((Cool*3 OR chill*3) NEAR5 (person*1 OR body OR animal*1 OR mammal*1 OR human)) AND (garment OR cloth*3 OR shirt OR sheet OR jacket OR pant)) AND DP>=(18360101) AND DP<=(19971008)	Full text	8385
Thomson Innovation	ALL=(((Cool*3 OR chill*3) NEAR5 (person*1 OR body OR animal*1 OR mammal*1 OR human)) AND (garment OR cloth*3 OR shirt OR sheet OR jacket OR pant) AND (absorb*3 OR superabsorb*3 OR retain*3 OR restrain*3) AND (soak*3 OR immers*3 OR imbibe*3 OR drench*3)) AND DP>=(18360101) AND DP<=(19971008)	Full text	778
Thomson Innovation	ALL=(((Cool*3 OR chill*3) NEAR5 (person*1 OR body OR animal*1 OR mammal*1 OR human)) AND (garment OR cloth*3 OR shirt OR sheet OR jacket OR pant) AND ((liquid OR water OR aqua) SAME (soak*3 OR immers*3 OR imbibe*3 OR drench*3))) AND DP>=(18360101) AND DP<=(19971008)	Full text	828

Thomson Innovation	ALL=(((Cool*3 OR chill*3) NEAR5 (person*1 OR body OR animal*1 OR mammal*1 OR human)) AND (evaporate*3 OR dissipat*3 OR dispers*3 OR vaporiz*3) AND (absorb*3 OR superabsorb*3 OR retain*3 OR restrain*3) AND (soak*3 OR immers*3 OR imbib*3 OR drench*3)) AND DP>=(18360101) AND DP<=(19971008)	Full text	841
Thomson Innovation	ALL=(((Cool*3 OR chill*3) NEAR10 (person*1 OR body OR animal*1 OR mammal*1 OR human)) AND ((multilayer OR multi?layer OR composite OR group*3) NEAR5 (material OR garment OR cloth*3 OR fiber*)) AND (absorb*3 OR superabsorb*3 OR retain*3 OR restrain*3) AND (soak*3 OR immers*3 OR imbib*3 OR drench*3)) AND DP>=(18360101) AND DP<=(19971008)	Full text	266
Thomson Innovation	ALL=(((Cool*3 OR chill*3) NEAR10 (person*1 OR body OR animal*1 OR mammal*1 OR human)) AND (garment OR cloth*3 OR shirt OR sheet OR jacket OR pant)) AND UC=(428* OR 442* OR 607*) AND DP>=(18360101) AND DP<=(19971008)	Full text	839
Thomson Innovation	ALL=(((Cool*3 OR chill*3) NEAR10 (person*1 OR body OR animal*1 OR mammal*1 OR human)) AND (garment OR cloth*3 OR shirt OR sheet OR jacket OR pant)) AND IC=((A61F* OR D01D* OR D04H* OR D06M*)) AND DP>=(18360101) AND DP<=(19971008)	Full text	613
Thomson Innovation	ALL=(((Cool*3 OR chill*3) NEAR10 (person*1 OR body OR animal*1 OR mammal*1 OR human)) AND (garment OR cloth*3 OR shirt OR sheet OR jacket OR pant)) AND PA=((Aquatex NEAR2 Industries) OR (Body NEAR2 cool) OR (Kendall NEAR2 Company) OR DuPont OR (Techniche NEAR2 Solutions) OR (Minnesota NEAR2 Mining) OR (Japan NEAR2 Exlan) OR (Hoechst NEAR2 Celanese) OR (Kimberly NEAR2 Clark) OR (Courtaulds NEAR2 Fibres) OR (Lion NEAR2 Apparel) OR (Procter NEAR2 Gamble) OR (Morning NEAR2 Pride) OR (Donaldson NEAR2 Company) OR (Gore NEAR2 Enterprise NEAR2 Holdings) OR (Vanson NEAR2 Leathers)) AND DP>=(18360101) AND DP<=(19971008)	Full text	67
Google Patent	Cooling a person and fibers and soak and absorb and evaporation	Full text	417

Google Scholar	Cooling a person and composite material and soak and absorb and evaporation (1700-1997)	Full text	310
USPTO Patent	(cool\$ AND person AND soak\$ AND absorb\$ AND fiber\$)	Full text	985
USPTO Patent Application	(cool\$ AND person AND soak\$ AND absorb\$ AND fiber\$)	Full text	1980
WIPO	Cooling person	Full text	158
Espacenet world wide	Cooling person	Full text	1058

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