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ES 2 344 691 T3

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## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference SHEEX1PCT	<b>FOR FURTHER ACTION</b> see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. <b>PCT/US2009/058716</b>	International filing date ( <i>day/month/year</i> ) <b>29 SEPTEMBER 2009 (29.09.2009)</b>	(Earliest) Priority Date ( <i>day/month/year</i> ) 29 SEPTEMBER 2008 (29.09.2008)
Applicant <b>SHEEX LLC et al</b>		

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

a. With regard to the language, the international search was carried out on the basis of :

the international application in the language in which it was filed

a translation of the international application into \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

b.  This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c.  With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2.  **Certain claims were found unsearchable** (See Box No. II)

3.  **Unity of invention is lacking** (See Box No. III)

4. With regard to the title,

the text is approved as submitted by the applicant.

the text has been established by this Authority to read as follows:

5. With regard to the abstract,

the text is approved as submitted by the applicant.

the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

a. the figure of the drawings to be published with the abstract is Figure No. 3

as suggested by the applicant.

as selected by this Authority, because the applicant failed to suggest a figure.



as selected by this Authority, because this figure better characterizes the invention.

b.  none of the figure is to be published with the abstract.



## INTERNATIONAL SEARCH REPORT

International application No.  
**PCT/US2009/058716**

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
<i>D04B 21/14(2006.01)i, D03D 11/00(2006.01)i</i>		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) D04B 21/14; A47G 9/00; A47G 9/02; A61G 7/05; B32B 5/26		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Korean utility models and applications for utility models Japanese utility models and applications for utility models (Chinese Patents and application for patent)		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) eKOMPASS(KIPO internal)		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 11-309183 A (MORIUCHI KYU KK) 09 November 1999 See paragraphs [0001] and [0010]-[0013]	1-17
X	US 6381779 B1 (THOMPSON; THOMAS L.) 07 May 2002 See claim 1 and figures 4-6	1
A	US 5817391 A1 (ROCK; MOSHE et al.) 06 October 1998 See column 1, line 66 - column 3, line 19	1-17
A	US 5765241 A1 (MACDONALD; ROBERT) 16 June 1998 See the whole document	1-17
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> 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 application or patent 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 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 "&" document member of the same patent family		
Date of the actual completion of the international search 28 APRIL 2010 (28.04.2010)		Date of mailing of the international search report <b>29 APRIL 2010 (29.04.2010)</b>
Name and mailing address of the ISA/KR  Korean Intellectual Property Office Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140		Authorized officer KIM, Jong Kyoo Telephone No. 82-42-481-5593 

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2009/058716**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 11-309183 A	09.11.1999	None	
US 6381779 B1	07.05.2002	US 6678906 B1 WO 0309-2452A1	20.01.2004 13.11.2003
US 5817391 A1	06.10.1998	None	
US 5765241 A1	16.06.1998	AU 1997-12445 B2 EP 0787451 A2 EP 0787451 A3 EP 0787451 B1 GB 2309638 A	27.05.1999 06.08.1997 13.10.1999 04.06.2003 06.08.1997

## PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

To:  
SCHNEIDER RYAN A.  
  
TROUTMAN SANDERS LLP BANK OF AMERICA  
PLAZA 600 PEACHTREE STREET, N.E., SUITE 5200  
ATLANTA GA 30308-2216 USA

PCT

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing  
(day/month/year) **29 APRIL 2010 (29.04.2010)**

Applicant's or agent's file reference

SHEEXIPCT

FOR FURTHER ACTION

See paragraph 2 below

International application No.

**PCT/US2009/058716**

International filing date (day/month/year)

**29 SEPTEMBER 2009 (29.09.2009)**

Priority date(day/month/year)

29 SEPTEMBER 2008 (29.09.2008)

International Patent Classification (IPC) or both national classification and IPC

**D04B 21/14(2006.01)i, D03D 11/00(2006.01)i**

Applicant

**SHEEX LLC et al**

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

## 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.  
For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/KR  
Korean Intellectual Property Office  
Government Complex-Daejeon, 139  
Seonsa-ro, Seo-gu, Daejeon 302  
-701, Republic of Korea  
Facsimile No. 82-42-472-7140



Date of completion of this opinion

28 APRIL 2010 (28.04.2010)

Authorized officer

KIM, Jong Kyoo

Telephone No.82-42-481-5593



WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.  
PCT/US2009/058716

Box No. 1 Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:
  - the international application in the language in which it was filed
  - a translation of the international application into \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))
2.  This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of:
  - a. a sequence listing filed or furnished
    - on paper
    - in electronic form
  - b. time of filing or furnishing
    - contained in the international application as filed.
    - filed together with the international application in electronic form.
    - furnished subsequently to this Authority for the purposes of search.
4.  In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

**PCT/US2009/058716**

**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	<u>1-17</u>	YES
	Claims	<u>NONE</u>	NO
Inventive step (IS)	Claims	<u>NONE</u>	YES
	Claims	<u>1-17</u>	NO
Industrial applicability (IA)	Claims	<u>1-17</u>	YES
	Claims	<u>NONE</u>	NO

2. Citations and explanations :

Reference is made to the following document:

D1: JP 11-309183 A (MORIUCHI KYU KK) 09 November 1999

1. Novelty and Inventive Step

1-1. Regarding claims 1-4

Most of the features of claim 1 are disclosed in D1 except for making the finished fabric at least 90 inches wide. However, it is considered to be a minor difference over the disclosure of D1, that are merely matters of design option when the general knowledge in relevant field of the art is used. Hence, no inventive step under PCT Article 33(3) is present in the subject matter of claim 1.

The additional feature of claim 2 is already disclosed in D1(see claim 3). The features added by claims 3 & 4 are considered to be a minor difference over the disclosure of D1(see paragraphs [0010]-[0013]), which fall under the general knowledge of a person skilled in the art. Hence, no inventive step under PCT Article 33(3) is present in the subject matter of claims 2-4.

1-2. Regarding claims 5-8

Most of the features of claim 5 are disclosed in D1 except for making the finished fabric at least 90 inches wide, circular knitting the fabric and stitching the fabric portions together. However, making the finished fabric at least 90 inches wide is considered to be a minor difference over the disclosure of D1, that is merely matters of design option when the general knowledge in relevant field of the art is used. Circular knitting and stitching are considered to be a minor difference over the disclosure of D1(see paragraphs [0010]-[0013]), which fall under the general knowledge of a person skilled in the art. Hence, no inventive step under PCT Article 33(3) is present in the subject matter of claim 5.

The additional feature of claim 6 is already disclosed in D1(see paragraph [0001]). The features added by claims 7 & 8 are a simple addition of conventional technique in this field as occasion demands. Hence, no inventive step under PCT Article 33(3) is present in the subject matter of claims 6-8.

1-3. Regarding claims 9-12

Most of the features of claim 9 are disclosed in D1 except for making the bed sheet at least 90 inches wide, circular knitting the fabric, stitching the fabric portions together and heat setting finishing. However, making the bed sheet at least 90 inches wide is considered to be a minor difference over the disclosure of D1, that is merely matters of design option when the general knowledge in relevant field of the art is used. Circular knitting and stitching are considered to be a minor difference over the disclosure of D1(see paragraphs [0010]-[0013]), which fall under the general knowledge of a person skilled in the art. Heat setting finishing without limitation of kinds of the material of the fiber is a simple addition of conventional technique as occasion demands. Hence, no inventive step under PCT Article 33(3) is present in the subject matter of claim 9.

Continued on Supplemental Box

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US2009/058716

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

Box V

The feature added by claim 10 is a simple addition of conventional technique in this field as occasion demands. The additional features of claims 11 & 12 are already disclosed in D1(see paragraph [0010]-[0013]). Hence, no inventive step under PCT Article 33(3) is present in the subject matter of claims 10-12.

1-4. Regarding claims 13-17

Most of the features of claim 13 are disclosed in D1 except for the finished fabric at least 90 inches wide and the circular knitted fabric. However, the finished fabric at least 90 inches wide is considered to be a minor difference over the disclosure of D1, that is merely matters of design option when the general knowledge in relevant field of the art is used. Circular knitted fabric is considered to be a minor difference over the disclosure of D1(see paragraphs [0010]-[0013]), which fall under the general knowledge of a person skilled in the art. Hence, no inventive step under PCT Article 33(3) is present in the subject matter of claim 13.

The feature added by claim 15 is a simple addition of conventional technique in this field as occasion demands. The additional features of claims 14, 16 & 17 are already disclosed in D1(see paragraph [0010]-[0013]). Hence, no inventive step under PCT Article 33(3) is present in the subject matter of claims 14-17.

2. Industrial Applicability

The subject matter of claims 1-17 is industrially applicable meeting the requirements of Article 33(4) PCT.

**ADVANCE E-MAIL**

From the INTERNATIONAL BUREAU

**PCT**

NOTIFICATION CONCERNING  
TRANSMITTAL OF COPY OF INTERNATIONAL  
PRELIMINARY REPORT ON PATENTABILITY  
(CHAPTER I OF THE PATENT COOPERATION  
TREATY)  
(PCT Rule 44bis.1(c))

To:

SCHNEIDER, Ryan, A.  
Troutman Sanders LLP  
Bank of America Plaza  
600 Peachtree Street, N.E.  
Suite 5200  
Atlanta, GA 30308-2216  
ETATS-UNIS D'AMERIQUE

Date of mailing <i>(day/month/year)</i> 07 April 2011 (07.04.2011)		
Applicant's or agent's file reference SHEEX1PCT		<b>IMPORTANT NOTICE</b>
International application No. PCT/US2009/058716	International filing date <i>(day/month/year)</i> 29 September 2009 (29.09.2009)	Priority date <i>(day/month/year)</i> 29 September 2008 (29.09.2008)
Applicant SHEEX LLC et al		

The International Bureau transmits herewith a copy of the international preliminary report on patentability (Chapter I of the Patent Cooperation Treaty)

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland  Facsimile No. +41 22 338 82 70	Authorized officer  <p style="text-align: center;"><b>Beate Giffo-Schmitt</b></p> e-mail: pt03.pct@wipo.int
---	---

**PATENT COOPERATION TREATY**

**PCT**

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

Applicant's or agent's file reference SHEEX1PCT	<b>FOR FURTHER ACTION</b>		See item 4 below
International application No. PCT/US2009/058716	International filing date ( <i>day/month/year</i> ) 29 September 2009 (29.09.2009)	Priority date ( <i>day/month/year</i> ) 29 September 2008 (29.09.2008)	
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237			
Applicant SHEEX LLC			

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

<input checked="" type="checkbox"/>	Box No. I	Basis of the report
<input type="checkbox"/>	Box No. II	Priority
<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/>	Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/>	Box No. VI	Certain documents cited
<input type="checkbox"/>	Box No. VII	Certain defects in the international application
<input type="checkbox"/>	Box No. VIII	Certain observations on the international application

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44*bis*.3(c) and 93*bis*.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44*bis* .2).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland  Facsimile No. +41 22 338 82 70	Date of issuance of this report 29 March 2011 (29.03.2011)
	Authorized officer  <p align="center"><b>Beate Giffo-Schmitt</b></p> e-mail: pt03.pct@wipo.int



## PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

# PCT

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To: SCHNEIDER RYAN A.  TROUTMAN SANDERS LLP BANK OF AMERICA PLAZA 600 PEACHTREE STREET, N.E., SUITE 5200 ATLANTA GA 30308-2216 USA
---

Date of mailing (day/month/year) <b>29 APRIL 2010 (29.04.2010)</b>
---

Applicant's or agent's file reference SHEEX1PCT	<b>FOR FURTHER ACTION</b> See paragraph 2 below
--	--

International application No. <b>PCT/US2009/058716</b>	International filing date (day/month/year) <b>29 SEPTEMBER 2009 (29.09.2009)</b>	Priority date(day/month/year) 29 SEPTEMBER 2008 (29.09.2008)
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International Patent Classification (IPC) or both national classification and IPC  <b>D04B 21/14(2006.01)i, D03D 11/00(2006.01)i</b>
--

Applicant <b>SHEEX LLC et al</b>
-------------------------------------



1. This opinion contains indications relating to the following items:
- Box No. I Basis of the opinion
  - Box No. II Priority
  - Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - Box No. IV Lack of unity of invention
  - Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
  - Box No. VI Certain documents cited
  - Box No. VII Certain defects in the international application
  - Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.  
For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

 Name and mailing address of the ISA/KR Korean Intellectual Property Office Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302 -701, Republic of Korea Facsimile No. 82-42-472-7140	Date of completion of this opinion 28 APRIL 2010 (28.04.2010)	Authorized officer KIM, Jong Kyoo Telephone No.82-42-481-5593	
---	--	---	---

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US2009/058716

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:
  - the international application in the language in which it was filed
  - a translation of the international application into \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))
2.  This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of:
  - a. a sequence listing filed or furnished
    - on paper
    - in electronic form
  - b. time of filing or furnishing
    - contained in the international application as filed.
    - filed together with the international application in electronic form.
    - furnished subsequently to this Authority for the purposes of search.
4.  In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

**PCT/US2009/058716**

**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-17	YES
	Claims	NONE	NO
Inventive step (IS)	Claims	NONE	YES
	Claims	1-17	NO
Industrial applicability (IA)	Claims	1-17	YES
	Claims	NONE	NO

2. Citations and explanations :

Reference is made to the following document :

D1: JP 11-309183 A (MORIUCHI KYU KK) 09 November 1999

1. Novelty and Inventive Step

1-1. Regarding claims 1-4

Most of the features of claim 1 are disclosed in D1 except for making the finished fabric at least 90 inches wide. However, it is considered to be a minor difference over the disclosure of D1, that are merely matters of design option when the general knowledge in relevant field of the art is used. Hence, no inventive step under PCT Article 33(3) is present in the subject matter of claim 1.

The additional feature of claim 2 is already disclosed in D1(see claim 3). The features added by claims 3 & 4 are considered to be a minor difference over the disclosure of D1(see paragraphs [0010]-[0013]), which fall under the general knowledge of a person skilled in the art. Hence, no inventive step under PCT Article 33(3) is present in the subject matter of claims 2-4.

1-2. Regarding claims 5-8

Most of the features of claim 5 are disclosed in D1 except for making the finished fabric at least 90 inches wide, circular knitting the fabric and stitching the fabric portions together. However, making the finished fabric at least 90 inches wide is considered to be a minor difference over the disclosure of D1, that is merely matters of design option when the general knowledge in relevant field of the art is used. Circular knitting and stitching are considered to be a minor difference over the disclosure of D1(see paragraphs [0010]-[0013]), which fall under the general knowledge of a person skilled in the art. Hence, no inventive step under PCT Article 33(3) is present in the subject matter of claim 5.

The additional feature of claim 6 is already disclosed in D1(see paragraph [0001]). The features added by claims 7 & 8 are a simple addition of conventional technique in this field as occasion demands. Hence, no inventive step under PCT Article 33(3) is present in the subject matter of claims 6-8.

1-3. Regarding claims 9-12

Most of the features of claim 9 are disclosed in D1 except for making the bed sheet at least 90 inches wide, circular knitting the fabric, stitching the fabric portions together and heat setting finishing. However, making the bed sheet at least 90 inches wide is considered to be a minor difference over the disclosure of D1, that is merely matters of design option when the general knowledge in relevant field of the art is used. Circular knitting and stitching are considered to be a minor difference over the disclosure of D1(see paragraphs [0010]-[0013]), which fall under the general knowledge of a person skilled in the art. Heat setting finishing without limitation of kinds of the material of the fiber is a simple addition of conventional technique as occasion demands. Hence, no inventive step under PCT Article 33(3) is present in the subject matter of claim 9.

Continued on Supplemental Box

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

Continuation of :

Box V

The feature added by claim 10 is a simple addition of conventional technique in this field as occasion demands. The additional features of claims 11 & 12 are already disclosed in D1(see paragraph [0010]-[0013]). Hence, no inventive step under PCT Article 33(3) is present in the subject matter of claims 10-12.

1-4. Regarding claims 13-17

Most of the features of claim 13 are disclosed in D1 except for the finished fabric at least 90 inches wide and the circular knitted fabric. However, the finished fabric at least 90 inches wide is considered to be a minor difference over the disclosure of D1, that is merely matters of design option when the general knowledge in relevant field of the art is used. Circular knitted fabric is considered to be a minor difference over the disclosure of D1(see paragraphs [0010]-[0013]), which fall under the general knowledge of a person skilled in the art. Hence, no inventive step under PCT Article 33(3) is present in the subject matter of claim 13.

The feature added by claim 15 is a simple addition of conventional technique in this field as occasion demands. The additional features of claims 14, 16 & 17 are already disclosed in D1(see paragraph [0010]-[0013]). Hence, no inventive step under PCT Article 33(3) is present in the subject matter of claims 14-17.

2. Industrial Applicability

The subject matter of claims 1-17 is industrially applicable meeting the requirements of Article 33(4) PCT.

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	11569120
<b>Application Number:</b>	13272977
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	4915
<b>Title of Invention:</b>	Fabric System
<b>First Named Inventor/Applicant Name:</b>	Susan Walvius
<b>Customer Number:</b>	26161
<b>Filer:</b>	Frank L. Gerratana/jennifer franco
<b>Filer Authorized By:</b>	Frank L. Gerratana
<b>Attorney Docket Number:</b>	29712-0002003
<b>Receipt Date:</b>	08-DEC-2011
<b>Filing Date:</b>	13-OCT-2011
<b>Time Stamp:</b>	09:48:40
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
------------------------	----

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	2003_ids.pdf	48939 <small>bc99387d8fcbad6f79216e8c82b7c83b6a1 91941</small>	no	1

### Warnings:

### Information:

000921

2	Information Disclosure Statement (IDS) Form (SB08)	2003_1449.pdf	81689 bdf0115f5a2a5dfa0acc6f8339a2de5e3281c7286	no	1
<b>Warnings:</b>					
<b>Information:</b>					
This is not an USPTO supplied IDS fillable form					
3	Foreign Reference	JP11309183A.pdf	27994 a4b28f8ee98615f61a9282c6f6057f716e61562	no	1
<b>Warnings:</b>					
<b>Information:</b>					
4	Foreign Reference	EP2344691_WO2010037082.pdf	1667089 edcef0422e1403dd422a49220dd068674ec53d29	no	23
<b>Warnings:</b>					
<b>Information:</b>					
5	Foreign Reference	WO2010037082.pdf	1680495 e83a6fb94b5acda0908e31c3057a1096c00adac3	no	23
<b>Warnings:</b>					
<b>Information:</b>					
6	Foreign Reference	ES2344691.pdf	9434474 f427fc097c8472d2942a393dec3fa40b93e5bcb	no	79
<b>Warnings:</b>					
<b>Information:</b>					
7	Non Patent Literature	ISR_WO_4_29_10.pdf	325104 4a7f64fb365a7c394f2fdd30e601b3309b505f7b	no	7
<b>Warnings:</b>					
<b>Information:</b>					
8	Non Patent Literature	IPRP_4_7_11.pdf	243759 27dca7d940375a8136cc2c319dd6f18cde787418b	no	6
<b>Warnings:</b>					
<b>Information:</b>					
9	Non Patent Literature	2AU1_VOLAMDT_4_12_11.pdf	205598 f68311c4e28fbfa3742b22cab8637eb21a164828	no	11
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			13715141		

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Susan Walvius et al.  
Serial No. : 13/272,977  
Filed : October 13, 2011  
Title : FABRIC SYSTEM

Art Unit : 3673  
Examiner : Nicholas F. Polito  
Conf. No. : 4915

**MAIL STOP AMENDMENT**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Please consider the references listed on the enclosed PTO-1449 form. Foreign patent documents and non-patent literature are enclosed; cited U.S. patents and patent application publications will be provided on request.

This statement is being filed within three months of the filing date of the application or before the receipt of a first Office Action on the merits. Please apply any necessary charges or credits to Deposit Account 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: December 6, 2011 \_\_\_\_\_

/Frank L. Gerratana/ \_\_\_\_\_  
Frank L. Gerratana  
Reg. No. 62,653

Customer Number 26161  
Fish & Richardson P.C.  
Telephone: (617) 542-5070  
Facsimile: (877) 769-7945

22752659.doc



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Susan Walvius et al.  
Serial No. : 13/272,977  
Filed : October 13, 2011  
Title : FABRIC SYSTEM

Art Unit : 3673  
Examiner : Nicholas F. Polito  
Conf. No. : 4915

**Mail Stop Amendment**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

RESPONSE TO RESTRICTION REQUIREMENT

In response to the restriction requirement made in the action mailed November 17, 2011, identified Group 1 (claims 14-37 and 41) is elected for examination. The election is made without traverse.

Please apply any necessary charges or credits to Deposit Account No. 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: November 30, 2011\_\_\_\_\_

/Frank L. Gerratana/\_\_\_\_\_  
Frank L. Gerratana  
Reg. No. 62,653

Customer Number 26161  
Fish & Richardson P.C.  
Telephone: (617) 542-5070  
Facsimile: (877) 769-7945

22747394.doc

**CERTIFICATE OF MAILING BY EFS-WEB FILING**

I hereby certify that this paper was filed with the Patent and Trademark Office using the EFS-WEB system on this date: November 28, 2011.

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	11512908
<b>Application Number:</b>	13272977
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	4915
<b>Title of Invention:</b>	Fabric System
<b>First Named Inventor/Applicant Name:</b>	Susan Walvius
<b>Customer Number:</b>	26161
<b>Filer:</b>	Frank L. Gerratana/jennifer franco
<b>Filer Authorized By:</b>	Frank L. Gerratana
<b>Attorney Docket Number:</b>	29712-0002003
<b>Receipt Date:</b>	30-NOV-2011
<b>Filing Date:</b>	13-OCT-2011
<b>Time Stamp:</b>	16:25:01
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
------------------------	----

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Response to Election / Restriction Filed	rr_response.pdf	55671 <small>5228584726083cb032f9fbb5173fc8bec4d641f</small>	no	1

### Warnings:

### Information:

000926

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/272,977	10/13/2011	Susan Walvius	29712-0002003	4915
26161	7590	11/22/2011	EXAMINER	
FISH & RICHARDSON P.C. (BO)			POLITO, NICHOLAS F	
P.O. BOX 1022			ART UNIT	PAPER NUMBER
MINNEAPOLIS, MN 55440-1022			3673	
			NOTIFICATION DATE	DELIVERY MODE
			11/22/2011	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

NOV 23 2011

**Decision Granting Request for  
Prioritized Examination (Track I)**
Application No.: 13/272,977

1. THE REQUEST FILED 10/13/11 IS GRANTED.

The above-identified application has met the requirements for prioritized examination (Track I).

2. **The above-identified application will undergo prioritized examination.** The application will be accorded special status throughout its entire course of prosecution until one of the following occurs:

- A. filing a petition for extension of time to extend the time period for filing a reply;
- B. filing an amendment to amend the application to contain more than four independent claims, more than thirty total claims, or a multiple dependent claim;
- C. filing a request for continued examination;
- D. filing a notice of appeal;
- E. filing a request for suspension of action;
- F. mailing of a notice of allowance;
- G. mailing of a final Office action;
- H. completion of examination as defined in 37 CFR 41.102; or
- I. abandonment of the application.

Telephone inquiries with regard to this decision should be directed to STEVEN MEYERS (571) 272-

6611

at 6611. In his/her absence, calls may be directed to ROBERT WEINHARDT (571) 272-

6633.

[Signature]

TC QUALITY ASSURANCE  
(Title) SPECIALIST



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/272,977	10/13/2011	Susan Walvius	29712-0002003	4915
26161	7590	11/17/2011	EXAMINER	
FISH & RICHARDSON P.C. (BO)			POLITO, NICHOLAS F	
P.O. BOX 1022			ART UNIT	PAPER NUMBER
MINNEAPOLIS, MN 55440-1022			3673	
			NOTIFICATION DATE	DELIVERY MODE
			11/17/2011	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

**Office Action Summary**

<b>Application No.</b> 13/272,977	<b>Applicant(s)</b> WALVIUS ET AL.	
<b>Examiner</b> NICHOLAS POLITO	<b>Art Unit</b> 3673	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1)  Responsive to communication(s) filed on 13 October 2011.
- 2a)  This action is **FINAL**.
- 2b)  This action is non-final.
- 3)  An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 4)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 5)  Claim(s) 14-41 is/are pending in the application.  
5a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 6)  Claim(s) \_\_\_\_\_ is/are allowed.
- 7)  Claim(s) \_\_\_\_\_ is/are rejected.
- 8)  Claim(s) \_\_\_\_\_ is/are objected to.
- 9)  Claim(s) 14-41 are subject to restriction and/or election requirement.

**Application Papers**

- 10)  The specification is objected to by the Examiner.
- 11)  The drawing(s) filed on \_\_\_\_\_ is/are: a)  accepted or b)  objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 13)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a)  All   b)  Some \*   c)  None of:  
1.  Certified copies of the priority documents have been received.  
2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1)  Notice of References Cited (PTO-892)
- 2)  Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3)  Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 5)  Notice of Informal Patent Application
- 6)  Other: \_\_\_\_\_.

Art Unit: 3673

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 14-37 and 41, drawn to a bed sheet, classified in class 5, subclass 482.
  - II. Claims 38-40, drawn to a bed, classified in class 5, subclass 737.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions II and I are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the subcombination has utility by itself or in other combinations. The subcombination has separate utility such as a couch cover.

The examiner has required restriction between combination and subcombination inventions. Where applicant elects a subcombination, and claims thereto are subsequently found allowable, any claim(s) depending from or otherwise requiring all the limitations of the allowable subcombination will be examined for patentability in accordance with 37 CFR 1.104. See MPEP § 821.04(a). Applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such



Art Unit: 3673

claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

3. Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and/or examination burden if restriction were not required because at least the following reason(s) apply:

- the inventions have acquired a separate status in the art in view of their different classification
- the inventions have acquired a separate status in the art due to their recognized divergent subject matter
- the inventions require a different field of search (e.g., searching different classes /subclasses or electronic resources, or employing different search strategies or search queries).

**Applicant is advised that the reply to this requirement to be complete must include (i) an election of a invention to be examined even though the requirement may be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.**

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement

Art Unit: 3673

will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to NICHOLAS POLITO whose telephone number is (571)270-5923. The examiner can normally be reached on Monday-Friday 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pete Cuomo can be reached on (571) 272-6856. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 3673

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nicholas Polito/  
Examiner, Art Unit 3673

/ROBERT G. SANTOS/  
Primary Examiner, Art Unit 3673

11/9/2011

<b>Index of Claims</b>  	<b>Application/Control No.</b>  13272977	<b>Applicant(s)/Patent Under Reexamination</b>  WALVIUS ET AL.
	<b>Examiner</b>  NICHOLAS POLITO	<b>Art Unit</b>  3673

✓	<b>Rejected</b>
=	<b>Allowed</b>

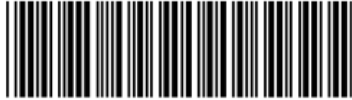
-	<b>Cancelled</b>
÷	<b>Restricted</b>

N	<b>Non-Elected</b>
I	<b>Interference</b>

A	<b>Appeal</b>
O	<b>Objected</b>

Claims renumbered in the same order as presented by applicant
  CPA
  T.D.
  R.1.47

CLAIM		DATE							
Final	Original	11/09/2011							
	1	-							
	2	-							
	3	-							
	4	-							
	5	-							
	6	-							
	7	-							
	8	-							
	9	-							
	10	-							
	11	-							
	12	-							
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	30	÷							
	31	÷							
	32	÷							
	33	÷							
	34	÷							
	35	÷							
	36	÷							

<b><i>Index of Claims</i></b>  	<b>Application/Control No.</b>  13272977	<b>Applicant(s)/Patent Under Reexamination</b>  WALVIUS ET AL.
	<b>Examiner</b>  NICHOLAS POLITO	<b>Art Unit</b>  3673

✓	<b>Rejected</b>
=	<b>Allowed</b>

-	<b>Cancelled</b>
÷	<b>Restricted</b>

N	<b>Non-Elected</b>
I	<b>Interference</b>

A	<b>Appeal</b>
O	<b>Objected</b>

Claims renumbered in the same order as presented by applicant
  CPA
  T.D.
  R.1.47

CLAIM		DATE							
Final	Original	11/09/2011							
	37	÷							
	38	÷							
	39	÷							
	40	÷							
	41	÷							

**PATENT APPLICATION FEE DETERMINATION RECORD**

Substitute for Form PTO-875

Application or Docket Number  
13/272,977

**APPLICATION AS FILED - PART I**

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A
TOTAL CLAIMS (37 CFR 1.16(j))	28 minus 20 = *	8
INDEPENDENT CLAIMS (37 CFR 1.16(h))	4 minus 3 = *	1
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).	
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))		

**SMALL ENTITY**

RATE(\$)	FEE(\$)
N/A	
N/A	
N/A	
<b>TOTAL</b>	

**OTHER THAN SMALL ENTITY**

RATE(\$)	FEE(\$)
N/A	380
N/A	620
N/A	250
x 60 =	480
x 250 =	250
	0.00
	0.00
<b>TOTAL</b>	<b>1980</b>

\* If the difference in column 1 is less than zero, enter "0" in column 2.

**APPLICATION AS AMENDED - PART II**

AMENDMENT A	(Column 1)	(Column 2)	(Column 3)
	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total (37 CFR 1.16(j))	* Minus **	=
	Independent (37 CFR 1.16(h))	* Minus ***	=
	Application Size Fee (37 CFR 1.16(s))		
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))			

**SMALL ENTITY**

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
<b>TOTAL ADD'L FEE</b>	

**OTHER THAN SMALL ENTITY**

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
<b>TOTAL ADD'L FEE</b>	

AMENDMENT B	(Column 1)	(Column 2)	(Column 3)
	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total (37 CFR 1.16(j))	* Minus **	=
	Independent (37 CFR 1.16(h))	* Minus ***	=
	Application Size Fee (37 CFR 1.16(s))		
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))			

**SMALL ENTITY**

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
<b>TOTAL ADD'L FEE</b>	

**OTHER THAN SMALL ENTITY**

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
<b>TOTAL ADD'L FEE</b>	

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.  
 \*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".  
 \*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".  
 The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.



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Table with 7 columns: APPLICATION NUMBER, FILING or 371(c) DATE, GRP ART UNIT, FIL FEE REC'D, ATTY. DOCKET NO, TOT CLAIMS, IND CLAIMS. Row 1: 13/272,977, 10/13/2011, 1783, 2280, 29712-0002003, 28, 4

CONFIRMATION NO. 4915

26161
FISH & RICHARDSON P.C. (BO)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

FILING RECEIPT



Date Mailed: 11/02/2011

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections

Applicant(s)

Susan Walvius, Chapin, SC;
Michelle Marciniak, Irmo, SC;

Assignment For Published Patent Application

SHEEX, INC.

Power of Attorney: The patent practitioners associated with Customer Number 26161

Domestic Priority data as claimed by applicant

This application is a CON of 12/569,659 09/29/2009
which claims benefit of 61/101,049 09/29/2008

Foreign Applications (You may be eligible to benefit from the Patent Prosecution Highway program at the USPTO. Please see http://www.uspto.gov for more information.)

If Required, Foreign Filing License Granted: 10/27/2011

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is US 13/272,977

Projected Publication Date: 02/09/2012

Non-Publication Request: No

Early Publication Request: No

**Title**

Fabric System

**Preliminary Class**

428

**PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

**LICENSE FOR FOREIGN FILING UNDER****Title 35, United States Code, Section 184****Title 37, Code of Federal Regulations, 5.11 & 5.15****GRANTED**

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as



set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

**NOT GRANTED**

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

# FISH & RICHARDSON P.C.

Street Address  
One Marina Park Drive  
Boston, Massachusetts  
02210-1878

Mail Address  
P.O. BOX 1022  
MINNEAPOLIS, MINNESOTA  
55440-1022

Telephone  
617 542-5070

Facsimile  
877 769-7945

WEB SITE  
[WWW.FR.COM](http://WWW.FR.COM)

Frederick P. Fish  
1855-1930

W.K. Richardson  
1859-1951

October 13, 2011

Attorney Docket No.: 29712-0002003

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Presented for filing is a continuation patent application of:

Applicant: SUSAN WALVIUS

Title: FABRIC SYSTEM

Assignee: SHEEX, INC.

Prioritized Examination of this application is hereby requested.

Enclosed are the following papers, including those required to receive a filing date under 37 C.F.R. § 1.53(b):

	<u>Pages</u>
Specification	12
Claims	2
Abstract	1
Declaration	2
Drawing(s)	4

Enclosures: Certification and Request For Prioritized Examination (Track I)

Preliminary amendment, 6 pages.

New disclosure information, including:

Information disclosure statement, 1 page

PTO-1449, 1 page

References, 6 items submitted.

This application is a continuation application of and claims priority to U.S. Serial No. 12/569,659, filed on September 29, 2009, which claims benefit under 35 USC § 119(e) of U.S. Provisional Patent Application Serial No. 61/101,049 filed 29 September 2008.



ATLANTA

AUSTIN

BOSTON

DALLAS

DELAWARE

HOUSTON

MUNICH

NEW YORK

SILICON VALLEY

SOUTHERN CALIFORNIA

TWIN CITIES

WASHINGTON, DC

Commissioner for Patents

October 13, 2011

Page 2

<b>Fees Due</b>	<b>Large</b>	<b>Small</b>	<b>Total</b>
Basic filing fee	\$380	\$190	\$380
Search fee	\$620	\$310	\$620
Examination fee	\$250	\$125	\$250
Publication fee	\$300	\$300	\$300
Track I processing fee	\$130	\$130	\$130
Track I prioritized examination fee	\$4800	\$2400	\$4800
Excess independent claim fee	\$250	\$125	\$250
Excess claim fee	\$60	\$30	\$480
<b>Total Fees Paid</b>			<b>\$ 7210</b>

The filing fee is being paid concurrently herewith on the Electronic Filing System (EFS) by way of Deposit Account authorization. Please apply all charges or credits to Deposit Account No. 06-1050, referencing Attorney Docket No. 29712-0002003.

If this application is found to be incomplete, or if a telephone conference would otherwise be helpful, please call the undersigned at (617) 542-5070.

Please direct all correspondence to the following:

**26161**

PTO Customer Number

Respectfully submitted,

/Frank L. Gerratana/

Frank L. Gerratana

Reg. No. 62,653

Enclosures

FLG/juf

22720734.doc

## FABRIC SYSTEM

### BACKGROUND OF THE INVENTION

#### CROSS REFERENCE TO RELATED APPLICATION

This application claims benefit under 35 USC § 119(e) of U.S. Provisional Patent  
5 Application Serial No. 61/101,049 filed 29 September 2008, which application is hereby  
incorporated fully by reference.

#### 1. Field of the Invention

The present invention relates generally to fabric systems, and more specifically to bed  
coverings constructed of high gauge circular knitted fabrics that accommodate and maintain  
10 optimum thermal conditions for sleep, which in turn can lead to faster sleep initiation and deeper,  
more restorative sleep.

#### 2. Description of Related Art

Sleep problems in the United States are remarkably widespread, affecting roughly three  
out of four American adults, according to research by the National Sleep Foundation (NSF).  
15 Consequently, a great deal of attention has been paid to the circumstances surrounding poor  
sleep, along with strategies for how to improve it.

The implications are not merely academic. Sleep – not only the right amount of it but  
also the right quality – impacts not just day-to-day performance, but also “the overall quality of  
our lives,” according to the NSF. Addressing the causes of poor quality sleep, therefore, has  
20 ramifications for millions.

Though many factors contribute to sleep quality, the sleep environment itself plays a  
critical role, and sleep researchers routinely highlight temperature as one of the most important  
components in creating an environment for optimal sleep. As advised by the University of  
Maryland Medical Center, “a cool (not cold) bedroom is often the most conducive to sleep.” The  
25 National Sleep Foundation further notes that “temperatures above 75 degrees Fahrenheit and  
below 54 degrees will disrupt sleep,” with 65 degrees being the ideal sleep temperature for most  
individuals, according to the NSF.

A lower environmental temperature is not the only thermal factor associated with improved sleep. Researchers have noted a nightly drop in body temperature among healthy, normal adults during sleep. This natural cycle, when inhibited or not functioning properly, can disrupt sleep and delay sleep onset, according to medical researchers at Cornell University. Conversely, the researchers noted, a rapid decline in body temperature not only accelerates sleep onset but also “may facilitate an entry into the deeper stages of sleep.”

Therefore, maintaining an appropriately cool sleep environment and accommodating the body’s natural tendency to cool itself at night should be a top priority for individuals interested in optimizing their sleep quality. Performance fabrics crafted into bedding applications would be uniquely capable of promoting cool, comfortable – and therefore better – sleep, as these advanced fabrics maximize breathability and heat transfer. Performance fabrics are made for a variety of end-use applications, and can provide multiple functional qualities, such as moisture management, UV protection, anti-microbial, thermo-regulation, and wind/water resistance.

There has been a long felt need in several industries to provide improved bedding to help individuals get better sleep. Such improved bedding would include beneficial wicking among other properties. For example, in marine, boating and recreational vehicle applications, bedding should resist moisture, fit odd-shaped mattresses and beds, and reduce mildew. Particularly with watercraft, there is a need to protect bedding, and specifically sheets, from moisture and mildew accumulation.

An additional problem with bedding, not just with marine and recreational vehicles, is the sticky, wet feeling that can occur when the bedding sheets are wet due to body sweat, environmental moisture, or other bodily fluids. In particular, when bedding is used during hot weather, or is continuously used for a long time by a person suffering from an illness, problems can arise in that the conventional bed sheet of cotton fiber or the like cannot sufficiently absorb the moisture. All of these issues lead to poor sleep.

To date, performance fabric bedding products are not known. There are width limitations in the manufacturing of high gauge circular knit fabrics, because the finished width of bedding fabrics are dictated by the machine used in its construction. At present, performance fabrics are manufactured with a maximum width of under 90 inches wide, given present manufacturing and technical limitations, along with the inability of alternate manufacturing processes to produce a

fabric with identical performance attributes. Yet, normal bed sheet panels can be 102 by 91 inches or larger. Thus, performance fabrics cannot yet be used for bed sheets.

5 Some conventional solutions for the above issues that hinder a good night's sleep include United States Patent 4,648,186, which discloses an absorbent wood pulp cellulose fiber that is provided in a variety of sizes and is placed under a mattress. The wood pulp is water absorbent and acts to capture moisture to prevent such moisture from being retained by the bedding or the bedding sheets. However, this proposed solution does not interact with the bedding or the bedding sheets, but merely acts as a sponge for moisture that is in proximity to the target bedding.

10 United States Patent 5,092,088 discloses a sheet-like mat comprised of a mat cover, the inside of which is divided into a plurality of bag-like spaces, and a drying agent packed into a bag and contained in the bag-like spaces in such a manner that the drying agent cannot fall out of the bag-like spaces. A magnesium sulfate, a high polymer absorbent, a silica gel or the like can be used as the drying agent. As can be seen, this proposed solution to moisture in bedding is cumbersome and chemically-based.

15 In the athletic apparel industry, moisture wicking fabric has been used to construct athletic apparel. For example, United States Patent 5,636,380 discloses a base fabric of CoolmaxQ high moisture evaporation fabric having one or more insulating panels of ThermaxB or ThermastatQ hollow core fiber fabric having moisture wicking capability and applied to the inner side of the garment for skin contact at selected areas of the body where muscle protection is desired. However, this application cannot be applied to bedding sheets due to the limitations  
20 of the size of the performance fabrics manufactured. Further, performance fabric such as this type cannot be easily stitched together as the denier is so fine that stitching this fabric results in the stitching simply falling apart.

25 Circular knitting is typically used for athletic apparel. The process includes circularly knitting yarns into fabrics. Circular knitting is a form of weft knitting where the knitting needles are organized into a circular knitting bed. A cylinder rotates and interacts with a cam to move the needles reciprocally for knitting action. The yarns to be knitted are fed from packages to a carrier plate that directs the yarn strands to the needles. The circular fabric emerges from the knitting needles in a tubular form through the center of the cylinder. This process is described in  
30 United States Patent 7,117,695. However, the machinery presently available for this method of

manufacture can only produce a fabric with a maximum width of approximately 90 inches. Therefore, this process has not been known to manufacture sheets, since sheets can have dimensions of 91 inches by 102 inches or greater.

Further, the machinery that is used for bedding is very different than for athletic wear. For example, bedding manufacturing equipment is not equipped to sew flatlock stitching or to provide circular knitting. Bed sheets typically are knit using a process known as warp knitting, a process capable of producing finished fabrics in the widths required for bedding. This method, however, cannot be employed to produce high-quality performance fabrics. Warp knitting is not capable of reproducing these fabrics' fine tactile qualities nor their omni-direction stretch properties, for example.

Circular knitting must be employed to produce a performance fabric that retains these fabric's full range of benefits and advantages. However, in order to produce a fabric of the proper width for bedding applications, a circular knit machine of at least 48 inches in diameter would be necessary. Manufacturing limitations therefore preclude the construction of performance fabrics at proper widths for bedding. The industry is unsure if it could actually knit and then finish performance fabrics at these large sizes, even if the machinery were readily available.

Further, athletic sewing factories are typically not equipped to sew and handle large pieces of fabrics so that equipment limitations do not allow for the manufacture of bedding sheets.

What is needed, therefore, is a bedding system that utilizes performance fabrics and their beneficial properties, the design of which acknowledges and addresses limitations in the manufacture of these fabrics. It is to such a system that the present invention is primarily directed.

## **BRIEF SUMMARY OF THE INVENTION**

Briefly described, in preferred form, the present invention is a high gauge circular knit fabric for use in bedding, and a method for manufacturing such bedding. The bedding fabric has superior performance properties, while allowing for manufacture by machinery presently available and in use. In order to achieve a finished width of the size needed to create sheet-sized

performance fabric, a high gauge circular knit machine of at least 48 inches in diameter is necessary. And while warp knitting machines are available that can produce wider fabrics, this method will not provide a fabric with the tactile qualities required, nor provide a fabric with omni-directional stretch.

5           In an exemplary embodiment, the present invention is a method of making a finished fabric comprising at least two discrete performance fabric portions, and joining at least two discrete performance fabric portions to form the finished fabric. Forming the at least two discrete performance fabric portions can comprise knitting at least two discrete performance fabric portions, and more preferably, circular knitting at least two discrete performance fabric portions. Joining the at least two discrete performance fabric portions to form the finished fabric can comprise stitching at least two discrete performance fabric portions together to form the finished fabric.

15           The at least two discrete performance fabric portions can have different fabric characteristics. Fabric characteristics as used herein include, among other things, moisture management, UV protection, anti-microbial, thermo-regulation, wind resistance and water resistance.

The finished fabric can be used in, among other applications, residential settings, or in marine, boating and recreational vehicle environments.

20           The present sheets offer enhanced drape and comfort compared to traditional cotton bedding, and are as fine as silk, yet provide the benefits of high elasticity and recovery along with superior breathability, body-heat transport, and moisture management as compared to traditional cotton bedding.

25           Conventional fitted sheets can bunch and slide on standard mattress sizes. Furthermore, if the fitted bed sheets do not fit properly, they do not provide a smooth surface to lie on. The present invention overcomes these issues.

The present high gauge circular knit fabrics stretch to fit and offer superior recovery on the mattress allowing the fabric to conform to fit the mattress without popping off the corners of the mattress or billowing. The performance fabric can include spandex, offers a better fit than



conventional bedding products, can accommodate larger or smaller mattress sizes with a single size sheet, and can conform to mattresses with various odd dimensions.

5 Spandex - or elastane - is a synthetic fiber known for its exceptional elasticity. It is stronger and more durable than rubber, its major non-synthetic competitor. It is a polyurethane-polyurea copolymer that was invented by DuPont. "Spandex" is a generic name, and an anagram of the word "expands." "Spandex" is the preferred name in North America; elsewhere it is referred to as "elastane." The most famous brand name associated with spandex is Lycra, a trademark of Invista.

10 The present high gauge circular knit fabric offers durability in reduced pilling and pulling when compared to other knit technologies, and offer reduced wrinkles and enhanced color steadfastness

15 In a preferred embodiment, the present performance fabric can allow for a one-size fitted sheet that can actually fit two different size mattresses. For example, the full fitted sheet of the present invention can fit on both the full and queen size bed. The twin fitted sheet of the present invention will also fit an XL twin. In a boating application, the present invention can be produced to fit almost every custom boat mattress.

20 Testing of the present invention conducted at the North Carolina State University (NCSU) Center for Research on Textile Protection and Comfort confirms that the present performance fabrics provide a cooler sleeping environment than cotton. Performance bedding was tested side-by-side with commercially available cotton bed sheets in a series of procedures designed to measure each product's heat- and moisture-transport properties, as well as warm/cool-to-touch thermal transport capabilities.

25 Across all tests, the present performance fabrics in bedding outperformed cotton, demonstrating the performance fabric's superiority in establishing and maintaining thermal comfort during sleep. This advantage is evident to users from the very onset, as NCSU testing indicates that, on average, performance bedding of the present invention offers improved heat transfer upon initial contact with the skin, resulting in a cooler-to-the-touch feeling.

During sleep, high gauge circular knit performance bedding of the present invention helps to maintain thermal comfort by trapping less body heat and breathing better than cotton.

Testing has demonstrated that performance bedding made out of performance fabrics transfers heat away from the body up to two times more effectively than cotton. This is critically important not only for sustained comfort during sleep, but also in terms of enabling the body to cool itself as rapidly as possible to facilitate sleep onset. In addition to trapping less heat,  
5 performance bedding breathes better than cotton – up to 50% better, giving performance bedding a strong advantage in terms of ventilation and heat and moisture transfer.

The performance advantage over cotton holds true for simulated dry and wet skin conditions, confirming that certain performance fabrics in bedding are better suited than cotton at managing moisture (e.g., sweat) to maintain thermal comfort. In addition to wicking moisture  
10 away from the skin through capillary action, the performance fabric's advanced breathability further enables heat and moisture transfer through evaporative cooling. As a result, the user is kept cooler, drier and more comfortable than with cotton.

The present performance bedding holds a distinct advantage over cotton in enabling, accommodating and maintaining optimum thermal conditions for sleep, which in turn can lead to  
15 faster sleep initiation and deeper, more restorative sleep.

These and other objects, features and advantages of the present invention will become more apparent upon reading the following specification in conjunction with the accompanying drawings.

### **BRIEF DESCRIPTION OF THE FIGURES**

20 **Fig. 1** illustrates a preferred embodiment of the present invention.

**Fig. 2** illustrates another preferred embodiment of the present invention.

**Fig. 3** illustrates a further preferred embodiment of the present invention.

**Fig. 4** illustrates another preferred embodiment of the present invention.

### **DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS**

25 Although preferred embodiments of the invention are explained in detail, it is to be understood that other embodiments are contemplated. Accordingly, it is not intended that the invention is limited in its scope to the details of construction and arrangement of components set forth in the following description or illustrated in the drawings. The invention is capable of other

embodiments and of being practiced or carried out in various ways. Also, in describing the preferred embodiments, specific terminology will be resorted to for the sake of clarity.

It must also be noted that, as used in the specification and the appended claims, the singular forms “a,” “an” and “the” include plural referents unless the context clearly dictates otherwise. For example, reference to a sheet or portion is intended also to include the manufacturing of a plurality of sheets or portions. References to a sheet containing “a” constituent is intended to include other constituents in addition to the one named.

Also, in describing the preferred embodiments, terminology will be resorted to for the sake of clarity. It is intended that each term contemplates its broadest meaning as understood by those skilled in the art and includes all technical equivalents which operate in a similar manner to accomplish a similar purpose.

Ranges may be expressed herein as from “about” or “approximately” one particular value and/or to “about” or “approximately” another particular value. When such a range is expressed, another embodiment includes from the one particular value and/or to the other particular value.

By “comprising” or “containing” or “including” is meant that at least the named compound, element, particle, or method step is present in the composition or article or method, but does not exclude the presence of other compounds, materials, particles, method steps, even if the other such compounds, material, particles, method steps have the same function as what is named.

It is also to be understood that the mention of one or more method steps does not preclude the presence of additional method steps or intervening method steps between those steps expressly identified. Similarly, it is also to be understood that the mention of one or more components in a fabric or system does not preclude the presence of additional components or intervening components between those components expressly identified.

Referring now in detail to the drawing figures, wherein like reference numerals represent like parts throughout the several views, the present invention of **Figs. 1 and 4** provides a sheet **10** shown having dimensions of 102 inches in length and 91 inches in width. The material is manufactured from performance fabric, which can include, for example, varying amounts of one or more of Lycra, Coolmax, Thermax and Thermastat. In a preferred embodiment, the fabric is

treated so that the fabric has antimicrobial properties. By using circular-knit performance fabric, the fabric is able to provide elasticity in all four directions. This property allows for the sheet to fit extraordinary mattress, cushion and bedding shapes, as well as providing better fits for traditional rectangular sheets. By using performance fabrics, the sheet has elastic properties that  
5 allow stretching in the directions shown as **30**. In addition, by using circular-knit performance fabric, the resulting bedding retains an exceptionally fine tactile quality critical for providing maximum levels of enhanced comfort.

An alternative to circular knitting is non-circular knitting – for example, warp knitting. This method can achieve widths greater than circular knitting. Industrial warp knit machines, for  
10 example, can produce tricote warp knit fabrics up to 130-140 inches in width. Circular knitting, however, is less expensive, as it requires less set-up time. Circular knitting also provides greater multidirectional stretch.

In order to provide a sheet that exceeds the maximum dimensions of fabric that can be produced by available circular knitting machines, flat lock stitching **12** is used to join a plurality  
15 of portions resulting in a sheet that is 91 inches wide (as shown). In an exemplary embodiment, piping **11** can be included in close proximity to the stitching. The stitching can be the same color as the fabric of the sheet portions, or different color(s). The piping can be 3/4 inch straight piping without a cord or other filler. In one preferred embodiment, the stitching is 16 stitches per inch. Piping **11** can be included at one end of the sheet and can be the same or a different color  
20 as the sheet fabric.

For a fitted sheet, the sheet can include an elastic portion surrounding the edge of the fitted sheet to better keep the fitted sheet in place when placed on a mattress or other sleeping surface. A cord can be sewn into the edge of the fitted sheet and cinched around the mattress or other sleeping surface to better hold the fitted sheet in place.

25 Referring to **Fig. 2**, a sheet is shown having dimensions of 91 inches wide and 102 inches in length. In this embodiment, stitching **14** is shown 34 inches from an interior edge **18** of a main portion **16** and another stitch **14** at edge **20** of the sewn-on portion. Flat lock stitching can be used for the stitching. Piping can be applied at or in proximity to the stitching.

30 Referring to **Fig. 3**, a non-rectangular shaped sheet is shown. In this exemplary embodiment, elastic can be included around the edge of the fitted sheet to better maintain the

fitted sheet in position when placed on a sleeping surface. In one embodiment, pull ties **24** can be installed at various locations around the edge of the fitted sheet in order to assist in maintaining the fitted sheet secured to the sleeping surface. The pull tie can be cinched to increase tension around the edge of the fitted sheet as shown by **26**.

5           Stitching used for securing the portions of the sheet together can include that shown as **28a**. In another embodiment, the stitching used for securing the portion of fabric together is shown as **28b**.

          Referring to **Fig. 4**, yet another preferred embodiment of the invention is shown. In this embodiment, the sheet can be assembled through stitching of differing fabrics for generating  
10 performance zones in the sheet. For example, zone **32** can have higher wicking properties than the other zones since this area is where the majority of the individual body rests. Areas **34a** through **34d** can have higher spandex or other elastic fabric properties so that the fit around a sleeping surface is improved. Area **36** may have thermal properties such as increased cooling since this area is generally where the individual's head lies. In an exemplary embodiment, the  
15 pillow covers of pillows used by the individual also have differing properties from the remainder of the sheet, e.g., thermal properties.

          The present invention encompasses the construction of bedding materials that have superior performance properties while allowing for manufacture by machinery presently available and in use. More specifically, the invention is related to a new method for fabricating a  
20 covering and or sheets in bedding. When using the circular knitting machine, the high gauge performance fabrics can only be made to a maximum size of 72.5 inches without losing the integrity of the spandex in the fabric. Yet, normal sheet panels are 102 x 91 inches. This presents problems when manufacturing sheets from performance fabrics.

          Additionally, special stitching techniques must be used given the thread density of the  
25 fabric. Using this special stitching, panels are sewn together to produce bedding or a sheet that is the proper size for standard bed sheets. Because discrete portions/panels are used in the manufacture of the present fabrics, panels can be selected that provide different properties for different areas of the bedding (**Fig. 4**). Stitching or seams on the sheet can also allow for the ease of making the bed. Because the bedding is made from performance fabric with spandex, it

stretches to permit multiple and custom sizing for applications in cribs, recreational vehicles and boats.

5 Circular knitting machines used for high gauge performance bedding fabrics are called high-gauge circular knitting machines, because of dense knitting with thin yarn. High gauge generally denotes 17 gauges or more. Seventeen gauges indicate that 17 or more cylinder needles are contained in one inch. Circular knitting machines of less than 17 gauges are referred to as low-gauge circular knitting machines. The low-gauge circular knitting machines are often used to knit outerwear.

10 “Yarn count” indicates the linear density (yarn diameter or fineness) to which that particular yarn has been spun. The choice of yarn count is restricted by the type of knitting machine employed and the knitting construction. The yarn count, in turn, influences the cost, weight, opacity, hand and drape of the resulting knitted structure. In general, staple spun yarns tend to be comparatively more expensive the finer their count, because finer fibers and a more exacting spinning process are necessary in order to prevent the yarn from showing an irregular  
15 appearance.

A top width in the 90-inch range is currently possible using a circular knit fabric formed on a 36-38-inch diameter machine, although higher levels of spandex in the performance fabric tend to pull the width in. In just one example, on a 30-inch diameter machine, the spandex can reduce an otherwise 94-inch circumference fabric tube to one with a 60-65 inch finished width.

20 A major limitation in finished width is not strictly a knitting concern but also concerns finishing. With performance fabric, it tends to sag in the middle – increasingly so with greater widths – making finishing difficult to impossible above a certain threshold. A possible 90-inch finished width is contingent upon having a good finishing set-up capable of handling the present performance fabric. This potential for difficulties would only become compounded at the larger  
25 widths required for bed sheets.

In a preferred process, the present fabric undergoes a heat setting finishing process. Applying a moisture-wicking finish to another fabric – like cotton – that can be produced at larger widths appears unlikely to match the moisture-control properties of the present fabric, as polyester itself is naturally moisture-resistant and there are physical actions (e.g. capillary action)

at play. Further, the use of cotton comes at the expense of breathability and heat-transfer capabilities (as confirmed by laboratory testing) and stretchability.

Numerous characteristics and advantages have been set forth in the foregoing description, together with details of structure and function. While the invention has been disclosed in several forms, it will be apparent to those skilled in the art that many modifications, additions, and deletions, especially in matters of shape, size, and arrangement of parts, can be made therein without departing from the spirit and scope of the invention and its equivalents as set forth in the following claims. Therefore, other modifications or embodiments as may be suggested by the teachings herein are particularly reserved as they fall within the breadth and scope of the claims here appended.

## CLAIMS

What is claimed is:

1. A method of making a finished fabric at least 90 inches wide comprising:  
forming at least two discrete performance fabric portions; and  
5 joining at least two discrete performance fabric portions to form the finished fabric.
2. The method according to Claim 1, wherein forming at least two discrete performance fabric portions comprises knitting at least two discrete performance fabric portions.
3. The method according to Claim 1, wherein forming at least two discrete performance fabric portions comprises circular knitting at least two discrete performance fabric portions.
- 10 4. The method according to Claim 1, wherein joining at least two discrete performance fabric portions to form the finished fabric comprises stitching at least two discrete performance fabric portions together to form the finished fabric.
5. A method of making a bed sheet at least 90 inches wide from performance fabric comprising:  
15 circular knitting at least two discrete performance fabric portions;  
stitching at least two discrete performance fabric portions together; and  
heat setting finishing the stitched at least two discrete performance fabric portions to form the finished bed sheet.
6. The method according to Claim 5, further comprising providing piping to the finished  
20 bed sheet.
7. The method according to Claim 5, wherein the at least two discrete performance fabric portions have different fabric characteristics.
8. The method according to Claim 7, wherein fabric characteristics are selected from the group consisting of moisture management, UV protection, anti-microbial, thermo-regulation,  
25 wind resistance and water resistance.
9. A finished fabric at least 90 inches wide comprising:  
a first circular knitted performance fabric; and



a second circular knitted performance fabric;

wherein the first and second performance fabrics are discrete; and

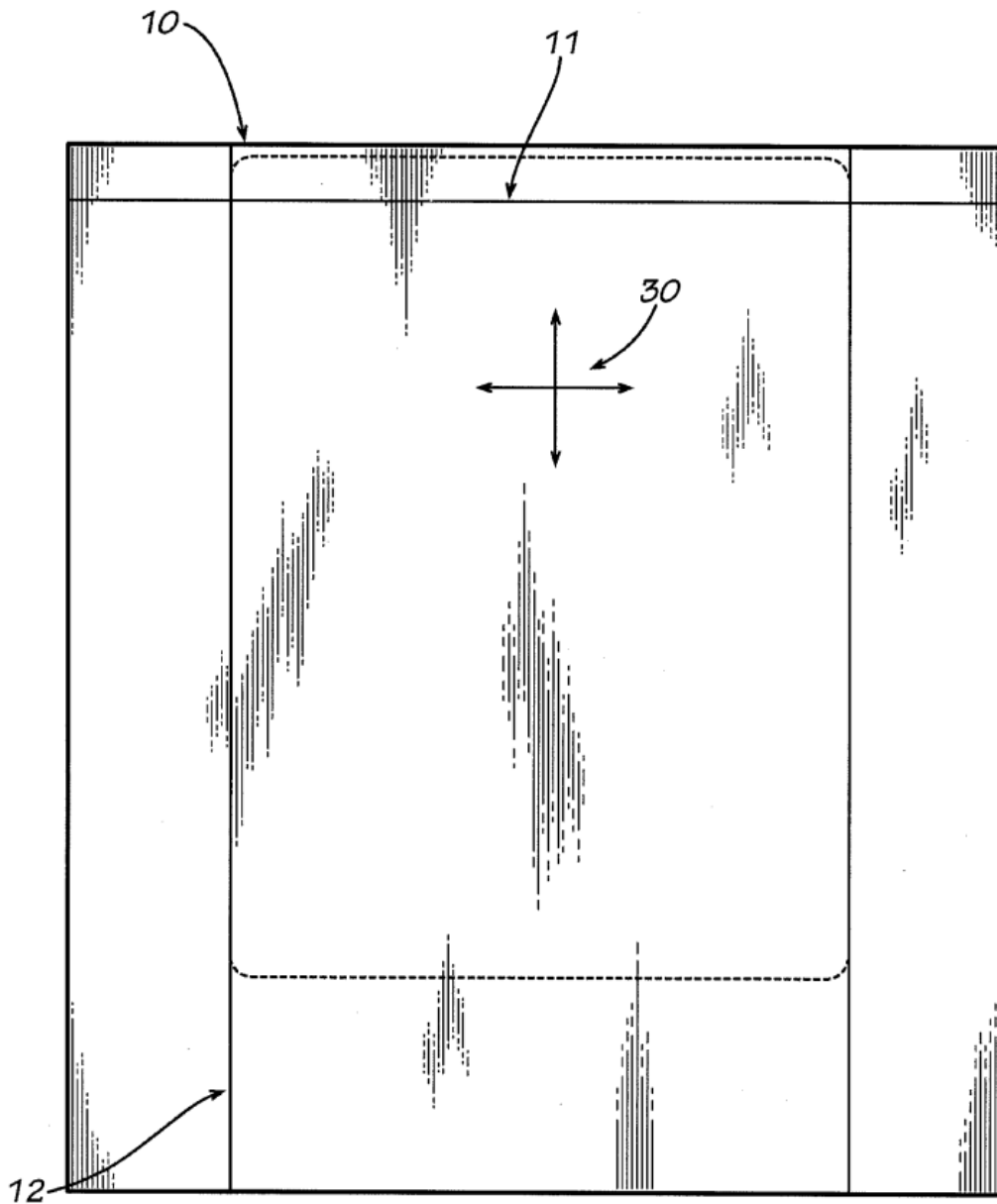
wherein the first and second performance fabrics are joined to form the finished fabric.

10. The finished fabric of Claim 9, wherein the finished fabric comprises a bed sheet.
- 5 11. The finished fabric of Claim 9, further comprising piping.
12. The finished fabric of Claim 9, wherein the first and second performance fabrics have different fabric characteristics.
13. The finished fabric of Claim 12, wherein fabric characteristics are selected from the group consisting of moisture management, UV protection, anti-microbial, thermo-regulation,  
10 wind resistance and water resistance.

## ABSTRACT

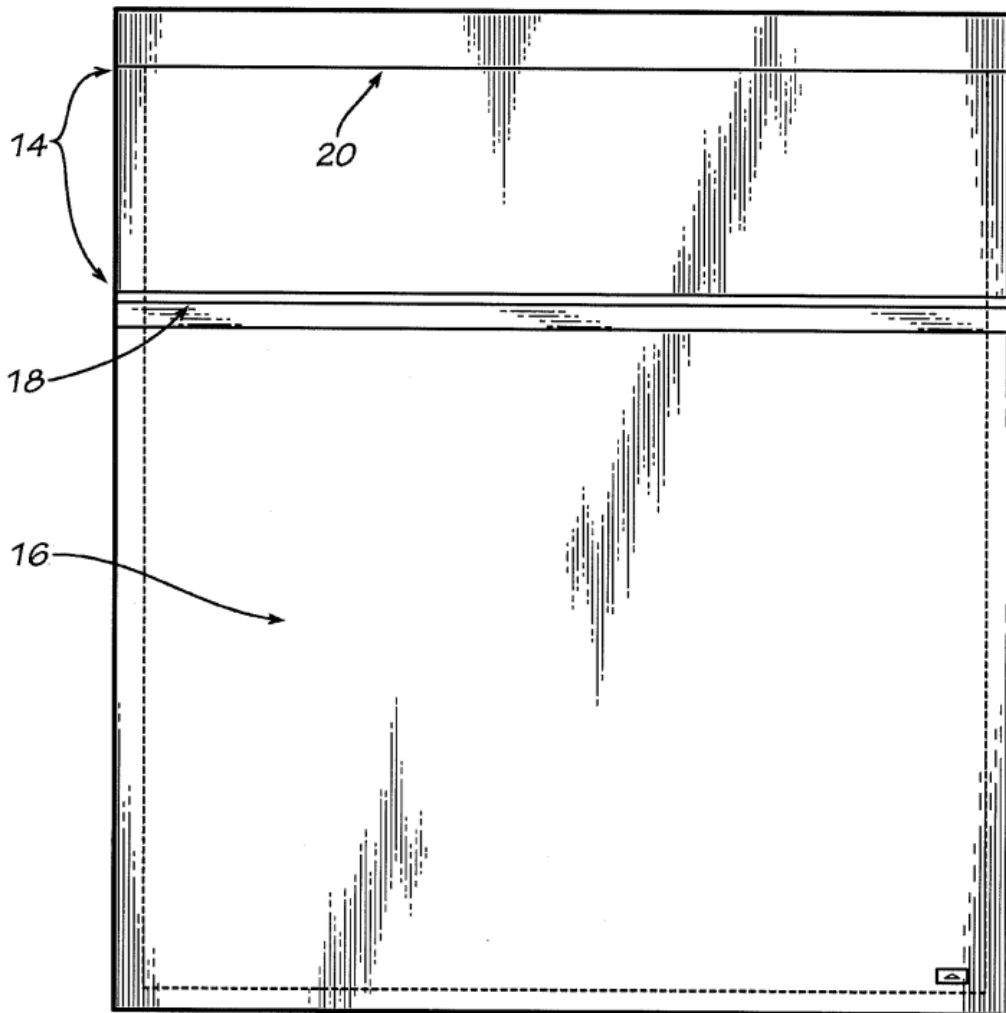
Bedding material including a first fabric section manufactured from performance fabric and having a first and second side; and, a second fabric section attached to the first side of the first fabric section. Additionally, a third fabric section can be attached to the second side of the first fabric section. The first fabric section can be attached to the second fabric section through a flatlock stitch. The first fabric section can include a first zone and a second zone wherein the first zone contains different performance properties from the second zone and the first zone can have thermal or moisture wicking properties.

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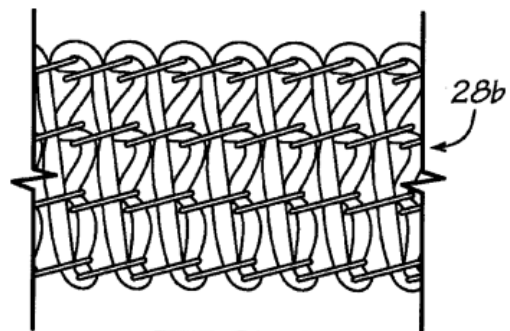
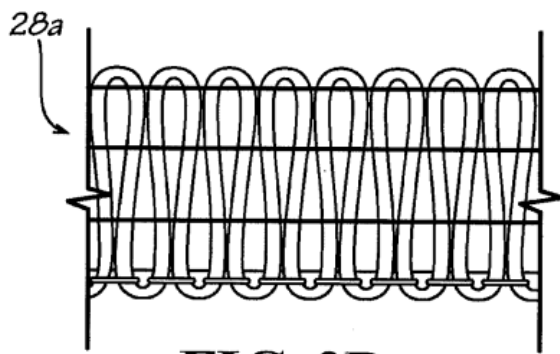
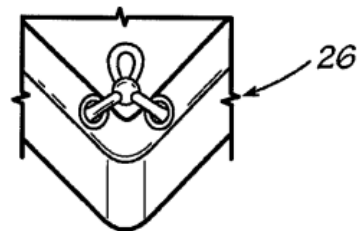
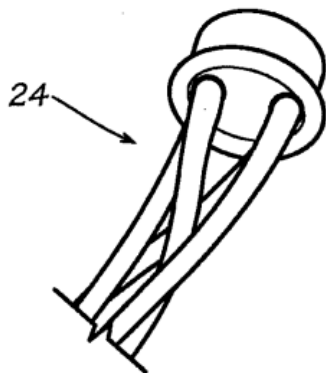
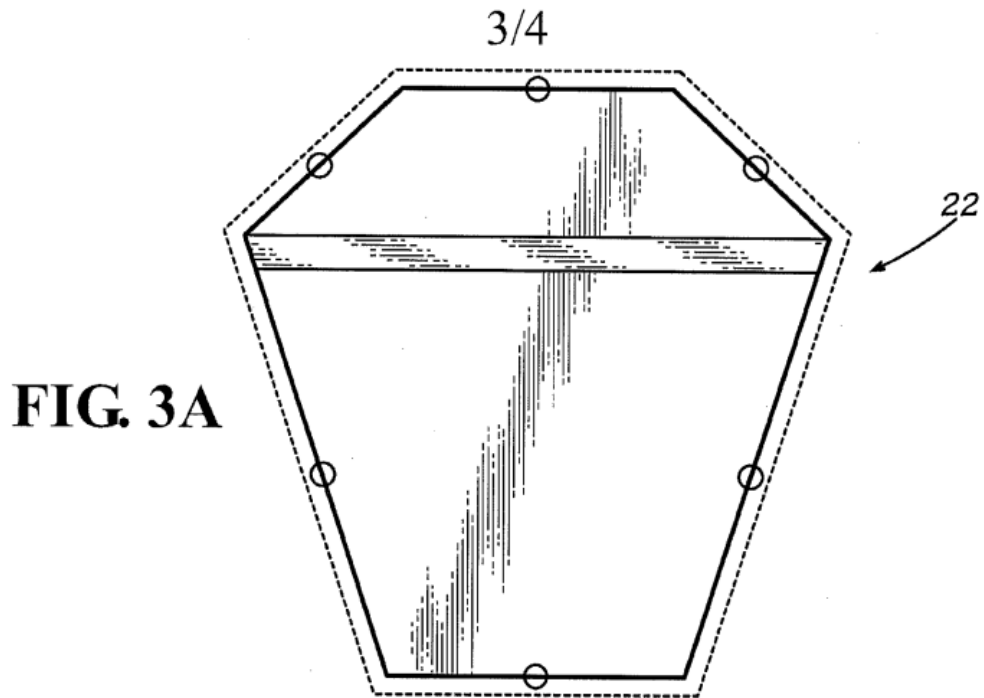


**FIG. 1**

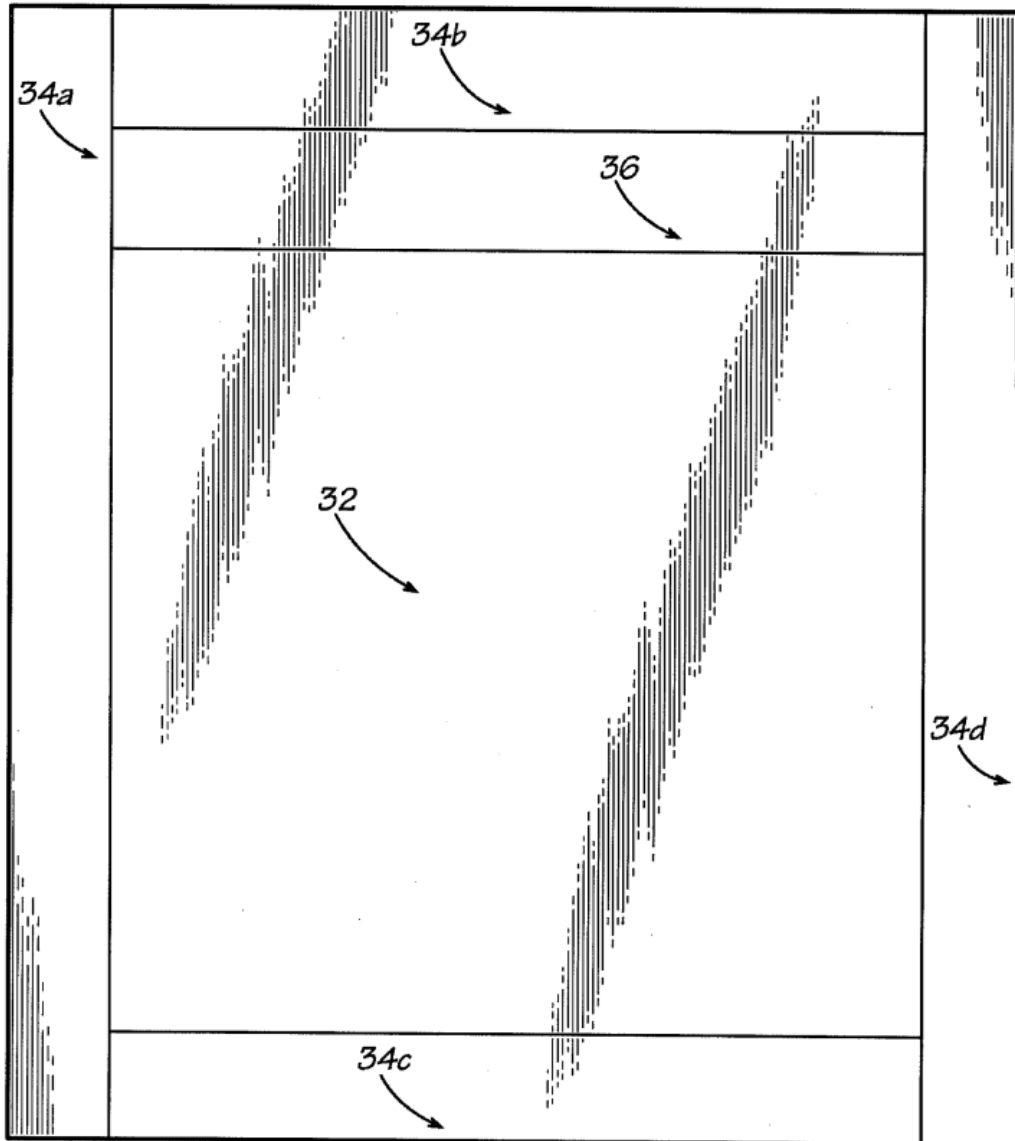
2/4



**FIG. 2**



4/4



**FIG. 4**

**COMBINED DECLARATION AND POWER OF ATTORNEY**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled FABRIC SYSTEM, the specification of which:

is attached hereto.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT International filing date of the continuation-in-part application.

I hereby claim the benefit under Title 35, United States Code, §119(e)(1) of any United States provisional application(s) listed below:

<u>U.S. Serial No.</u>	<u>Filing Date</u>	<u>Status</u>
61/101,049	09/29/2008	Abandoned

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose all information I know to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56(a) which became available between the filing date of the prior application and the national or PCT international filing date of this application:

<u>U.S. Serial No.</u>	<u>Filing Date</u>	<u>Status</u>
12/569,659	09/29/2009	Pending

I hereby appoint the following attorneys and/or agents to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

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**26161**

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**26161**

**PTO Customer Number**

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patents issued thereon.

**Combined Declaration and Power of Attorney**

Page 2 of 2 Pages

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**CERTIFICATION AND REQUEST  
 FOR PRIORITIZED EXAMINATION (TRACK I)** (Page 1 of 1)

First Named Inventor:	Susan Walvius	Nonprovisional Application Number (if known):	Unknown
Title of Invention:	Fabric System		

**APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS PRIORITIZED EXAMINATION (TRACK I) FOR THE ABOVE-IDENTIFIED APPLICATION.**

1. (a) The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a). This certification and request is being filed with the utility application via EFS-Web.

OR

(b) The application is an original nonprovisional plant application filed under 35 U.S.C. 111(a). This certification and request is being filed with the plant application in paper. (Note: Plant applications cannot be filed via EFS-Web.)

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- The following fees (in amounts consistent with the current fee schedule available at <http://www.uspto.gov/about/offices/cfo/finance/fees.jsp>) are filed with the application: (1) basic filing fee; (2) search fee; (3) examination fee; (4) any required excess claims fees; (5) any required application size fee; (6) publication fee; (7) processing fee (Track I) set forth in 37 CFR 1.17(i); and (8) prioritized examination fee (Track I) set forth in 37 CFR 1.17(c).
- An executed oath or declaration under 37 CFR 1.63 is filed with the application.
- The application contains or is amended to contain no more than four independent claims and no more than thirty total claims, and no multiple dependent claims.

Signature /Frank L. Gerratana/	Date October 13, 2011
Name Frank L. Gerratana (Print/Typed)	Practitioner Registration Number 62,653
<p><b>Note:</b> Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature. If necessary, submit multiple forms for more than one signature, see below*.</p>	
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Substitute Form PTO-1449 (Modified)  <b>Information Disclosure Statement by Applicant</b> (Use several sheets if necessary)  (37 CFR §1.98(b))	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 29712-0002003	Application No. Unknown
	Applicant Susan Walvius et al.		
	Filing Date Unknown	Group Art Unit Unknown	

### U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	1	6,381,779	05/07/02	Thompson			
	2	5,817,391	10/06/98	Rock et al.			
	3	6,765,241	06/16/98	Macdonald			

### Foreign Patent Documents or Published Foreign Patent Applications

Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation	
							Yes	No
	4	EP 2 344 691	07/20/11	EPO				
	5	JP 11309183	11/09/99	Japan				
	6	WO2010/037082	04/01/10	WIPO				

### Other Documents (include Author, Title, Date, and Place of Publication)

Examiner Initial	Desig. ID	Document
	7	Voluntary Amendment from corresponding Australian patent application no. 2009296195, filed April 12, 2011 (11 pages).
	8	International Preliminary Report on Patentability issued by the Korean Intellectual Property Office for related PCT Patent Application No. PCT/US2009/058716 dated April 7, 2011 (6 pages).
	9	International Search Report and Written Opinion issued by the Korean Intellectual Property Office for related PCT Patent Application No. PCT/US2009/058716 dated April 29, 2010.

Examiner Signature	Date Considered
EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
1 April 2010 (01.04.2010)

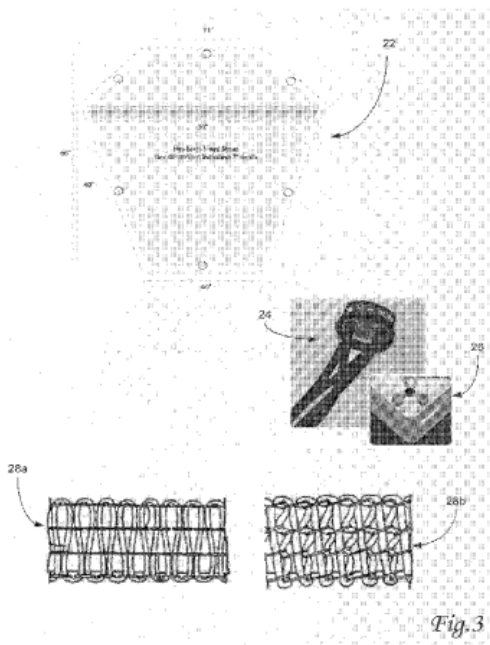
(10) International Publication Number  
**WO 2010/037082 A2**

- (51) International Patent Classification:  
*D04B 21/14* (2006.01)    *D03D 11/00* (2006.01)
- (21) International Application Number:  
PCT/US2009/058716
- (22) International Filing Date:  
29 September 2009 (29.09.2009)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
61/101,049 29 September 2008 (29.09.2008) US
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- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, 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, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (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, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**  
— without international search report and to be republished upon receipt of that report (Rule 48.2(g))

(54) Title: FABRIC SYSTEM



(57) Abstract: Bedding material including a first fabric section manufactured from performance fabric and having a first and second side; and, a second fabric section attached to the first side of the first fabric section. Additionally, a third fabric section can be attached to the second side of the first fabric section. The first fabric section can be attached to the second fabric section through a flatlock stitch. The first fabric section can include a first zone and a second zone wherein the first zone contains different performance properties from the second zone and the first zone can have thermal or moisture wicking properties.

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## FABRIC SYSTEM

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

The present invention relates generally to fabric systems, and more specifically to bed coverings constructed of high gauge circular knitted fabrics that accommodate and maintain optimum thermal conditions for sleep, which in turn can lead to faster sleep initiation and deeper, more restorative sleep.

#### 2. Description of Related Art

Sleep problems in the United States are remarkably widespread, affecting roughly three out of four American adults, according to research by the National Sleep Foundation (NSF). Consequently, a great deal of attention has been paid to the circumstances surrounding poor sleep, along with strategies for how to improve it.

The implications are not merely academic. Sleep – not only the right amount of it but also the right quality – impacts not just day-to-day performance, but also “the overall quality of our lives,” according to the NSF. Addressing the causes of poor quality sleep, therefore, has ramifications for millions.

Though many factors contribute to sleep quality, the sleep environment itself plays a critical role, and sleep researchers routinely highlight temperature as one of the most important components in creating an environment for optimal sleep. As advised by the University of Maryland Medical Center, “a cool (not cold) bedroom is often the most conducive to sleep.” The National Sleep Foundation further notes that “temperatures above 75 degrees Fahrenheit and below 54 degrees will disrupt sleep,” with 65 degrees being the ideal sleep temperature for most individuals, according to the NSF.

A lower environmental temperature is not the only thermal factor associated with improved sleep. Researchers have noted a nightly drop in body temperature among healthy, normal adults during sleep. This natural cycle, when inhibited or not functioning properly, can disrupt sleep and delay sleep onset, according to medical researchers at Cornell University. Conversely, the researchers noted, a rapid decline in body temperature not only accelerates sleep onset but also “may facilitate an entry into the deeper stages of sleep.”

Therefore, maintaining an appropriately cool sleep environment and accommodating the body's natural tendency to cool itself at night should be a top priority for individuals interested in optimizing their sleep quality. Performance fabrics crafted into bedding applications would be uniquely capable of promoting cool, comfortable – and therefore better – sleep, as these advanced fabrics maximize breathability and heat transfer. Performance fabrics are made for a variety of end-use applications, and can provide multiple functional qualities, such as moisture management, UV protection, anti-microbial, thermo-regulation, and wind/water resistance.

There has been a long felt need in several industries to provide improved bedding to help individuals get better sleep. Such improved bedding would include beneficial wicking among other properties. For example, in marine, boating and recreational vehicle applications, bedding should resist moisture, fit odd-shaped mattresses and beds, and reduce mildew. Particularly with watercraft, there is a need to protect bedding, and specifically sheets, from moisture and mildew accumulation.

An additional problem with bedding, not just with marine and recreational vehicles, is the sticky, wet feeling that can occur when the bedding sheets are wet due to body sweat, environmental moisture, or other bodily fluids. In particular, when bedding is used during hot weather, or is continuously used for a long time by a person suffering from an illness, problems can arise in that the conventional bed sheet of cotton fiber or the like cannot sufficiently absorb the moisture. All of these issues lead to poor sleep.

To date, performance fabric bedding products are not known. There are width limitations in the manufacturing of high gauge circular knit fabrics, because the finished width of bedding fabrics are dictated by the machine used in its construction. At present, performance fabrics are manufactured with a maximum width of under 90 inches wide, given present manufacturing and technical limitations, along with the inability of alternate manufacturing processes to produce a fabric with identical performance attributes. Yet, normal bed sheet panels can be 102 by 91 inches or larger. Thus, performance fabrics cannot yet be used for bed sheets.

Some conventional solutions for the above issues that hinder a good night's sleep include United States Patent 4,648,186, which discloses an absorbent wood pulp cellulose fiber that is provided in a variety of sizes and is placed under a mattress. The wood pulp is water absorbent and acts to capture moisture to prevent such moisture from being retained by the bedding or the

bedding sheets. However, this proposed solution does not interact with the bedding or the bedding sheets, but merely acts as a sponge for moisture that is in proximity to the target bedding.

United States Patent 5,092,088 discloses a sheet-like mat comprised of a mat cover, the inside of which is divided into a plurality of bag-like spaces, and a drying agent packed into a bag and contained in the bag-like spaces in such a manner that the drying agent cannot fall out of the bag-like spaces. A magnesium sulfate, a high polymer absorbent, a silica gel or the like can be used as the drying agent. As can be seen, this proposed solution to moisture in bedding is cumbersome and chemically-based.

In the athletic apparel industry, moisture wicking fabric has been used to construct athletic apparel. For example, United States Patent 5,636,380 discloses a base fabric of CoolmaxQ high moisture evaporation fabric having one or more insulating panels of ThermaxB or ThermastatQ hollow core fiber fabric having moisture wicking capability and applied to the inner side of the garment for skin contact at selected areas of the body where muscle protection is desired. However, this application cannot be applied to bedding sheets due to the limitations of the size of the performance fabrics manufactured. Further, performance fabric such as this type cannot be easily stitched together as the denier is so fine that stitching this fabric results in the stitching simply falling apart.

Circular knitting is typically used for athletic apparel. The process includes circularly knitting yarns into fabrics. Circular knitting is a form of weft knitting where the knitting needles are organized into a circular knitting bed. A cylinder rotates and interacts with a cam to move the needles reciprocally for knitting action. The yarns to be knitted are fed from packages to a carrier plate that directs the yarn strands to the needles. The circular fabric emerges from the knitting needles in a tubular form through the center of the cylinder. This process is described in United States Patent 7,117,695. However, the machinery presently available for this method of manufacture can only produce a fabric with a maximum width of approximately 90 inches. Therefore, this process has not been known to manufacture sheets, since sheets can have dimensions of 91 inches by 102 inches or greater.

Further, the machinery that is used for bedding is very different than for athletic wear. For example, bedding manufacturing equipment is not equipped to sew flatlock stitching or to provide circular knitting. Bed sheets typically are knit using a process known as warp knitting, a

process capable of producing finished fabrics in the widths required for bedding. This method, however, cannot be employed to produce high-quality performance fabrics. Warp knitting is not capable of reproducing these fabrics' fine tactile qualities nor their omni-direction stretch properties, for example.

Circular knitting must be employed to produce a performance fabric that retains these fabric's full range of benefits and advantages. However, in order to produce a fabric of the proper width for bedding applications, a circular knit machine of at least 48 inches in diameter would be necessary. Manufacturing limitations therefore preclude the construction of performance fabrics at proper widths for bedding. The industry is unsure if it could actually knit and then finish performance fabrics at these large sizes, even if the machinery were readily available.

Further, athletic sewing factories are typically not equipped to sew and handle large pieces of fabrics so that equipment limitations do not allow for the manufacture of bedding sheets.

What is needed, therefore, is a bedding system that utilizes performance fabrics and their beneficial properties, the design of which acknowledges and addresses limitations in the manufacture of these fabrics. It is to such a system that the present invention is primarily directed.

#### **BRIEF SUMMARY OF THE INVENTION**

Briefly described, in preferred form, the present invention is a high gauge circular knit fabric for use in bedding, and a method for manufacturing such bedding. The bedding fabric has superior performance properties, while allowing for manufacture by machinery presently available and in use. In order to achieve a finished width of the size needed to create sheet-sized performance fabric, a high gauge circular knit machine of at least 48 inches in diameter is necessary. And while warp knitting machines are available that can produce wider fabrics, this method will not provide a fabric with the tactile qualities required, nor provide a fabric with omni-directional stretch.

In an exemplary embodiment, the present invention is a method of making a finished fabric comprising at least two discrete performance fabric portions, and joining at least two

discrete performance fabric portions to form the finished fabric. Forming the at least two discrete performance fabric portions can comprise knitting at least two discrete performance fabric portions, and more preferably, circular knitting at least two discrete performance fabric portions. Joining the at least two discrete performance fabric portions to form the finished fabric can comprise stitching at least two discrete performance fabric portions together to form the finished fabric.

The at least two discrete performance fabric portions can have different fabric characteristics. Fabric characteristics as used herein include, among other things, moisture management, UV protection, anti-microbial, thermo-regulation, wind resistance and water resistance.

The finished fabric can be used in, among other applications, residential settings, or in marine, boating and recreational vehicle environments.

The present sheets offer enhanced drape and comfort compared to traditional cotton bedding, and are as fine as silk, yet provide the benefits of high elasticity and recovery along with superior breathability, body-heat transport, and moisture management as compared to traditional cotton bedding.

Conventional fitted sheets can bunch and slide on standard mattress sizes. Furthermore, if the fitted bed sheets do not fit properly, they do not provide a smooth surface to lie on. The present invention overcomes these issues.

The present high gauge circular knit fabrics stretch to fit and offer superior recovery on the mattress allowing the fabric to conform to fit the mattress without popping off the corners of the mattress or billowing. The performance fabric can include spandex, offers a better fit than conventional bedding products, can accommodate larger or smaller mattress sizes with a single size sheet, and can conform to mattresses with various odd dimensions.

Spandex - or elastane - is a synthetic fiber known for its exceptional elasticity. It is stronger and more durable than rubber, its major non-synthetic competitor. It is a polyurethane-polyurea copolymer that was invented by DuPont. "Spandex" is a generic name, and an anagram of the word "expands." "Spandex" is the preferred name in North America; elsewhere it is



referred to as “elastane.” The most famous brand name associated with spandex is Lycra, a trademark of Invista.

The present high gauge circular knit fabric offers durability in reduced pilling and pulling when compared to other knit technologies, and offer reduced wrinkles and enhanced color steadfastness

In a preferred embodiment, the present performance fabric can allow for a one-size fitted sheet that can actually fit two different size mattresses. For example, the full fitted sheet of the present invention can fit on both the full and queen size bed. The twin fitted sheet of the present invention will also fit an XL twin. In a boating application, the present invention can be produced to fit almost every custom boat mattress.

Testing of the present invention conducted at the North Carolina State University (NCSU) Center for Research on Textile Protection and Comfort confirms that the present performance fabrics provide a cooler sleeping environment than cotton. Performance bedding was tested side-by-side with commercially available cotton bed sheets in a series of procedures designed to measure each product’s heat- and moisture-transport properties, as well as warm/cool-to-touch thermal transport capabilities.

Across all tests, the present performance fabrics in bedding outperformed cotton, demonstrating the performance fabric’s superiority in establishing and maintaining thermal comfort during sleep. This advantage is evident to users from the very onset, as NCSU testing indicates that, on average, performance bedding of the present invention offers improved heat transfer upon initial contact with the skin, resulting in a cooler-to-the-touch feeling.

During sleep, high gauge circular knit performance bedding of the present invention helps to maintain thermal comfort by trapping less body heat and breathing better than cotton. Testing has demonstrated that performance bedding made out of performance fabrics transfers heat away from the body up to two times more effectively than cotton. This is critically important not only for sustained comfort during sleep, but also in terms of enabling the body to cool itself as rapidly as possible to facilitate sleep onset. In addition to trapping less heat, performance bedding breathes better than cotton – up to 50% better, giving performance bedding a strong advantage in terms of ventilation and heat and moisture transfer.

The performance advantage over cotton holds true for simulated dry and wet skin conditions, confirming that certain performance fabrics in bedding are better suited than cotton at managing moisture (e.g., sweat) to maintain thermal comfort. In addition to wicking moisture away from the skin through capillary action, the performance fabric's advanced breathability further enables heat and moisture transfer through evaporative cooling. As a result, the user is kept cooler, drier and more comfortable than with cotton.

The present performance bedding holds a distinct advantage over cotton in enabling, accommodating and maintaining optimum thermal conditions for sleep, which in turn can lead to faster sleep initiation and deeper, more restorative sleep.

These and other objects, features and advantages of the present invention will become more apparent upon reading the following specification in conjunction with the accompanying drawings.

#### **BRIEF DESCRIPTION OF THE FIGURES**

**Fig. 1** illustrates a preferred embodiment of the present invention.

**Fig. 2** illustrates another preferred embodiment of the present invention.

**Fig. 3** illustrates a further preferred embodiment of the present invention.

**Fig. 4** illustrates another preferred embodiment of the present invention.

#### **DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS**

Although preferred embodiments of the invention are explained in detail, it is to be understood that other embodiments are contemplated. Accordingly, it is not intended that the invention is limited in its scope to the details of construction and arrangement of components set forth in the following description or illustrated in the drawings. The invention is capable of other embodiments and of being practiced or carried out in various ways. Also, in describing the preferred embodiments, specific terminology will be resorted to for the sake of clarity.

It must also be noted that, as used in the specification and the appended claims, the singular forms "a," "an" and "the" include plural referents unless the context clearly dictates otherwise. For example, reference to a sheet or portion is intended also to include the

manufacturing of a plurality of sheets or portions. References to a sheet containing “a” constituent is intended to include other constituents in addition to the one named.

Also, in describing the preferred embodiments, terminology will be resorted to for the sake of clarity. It is intended that each term contemplates its broadest meaning as understood by those skilled in the art and includes all technical equivalents which operate in a similar manner to accomplish a similar purpose.

Ranges may be expressed herein as from “about” or “approximately” one particular value and/or to “about” or “approximately” another particular value. When such a range is expressed, another embodiment includes from the one particular value and/or to the other particular value.

By “comprising” or “containing” or “including” is meant that at least the named compound, element, particle, or method step is present in the composition or article or method, but does not exclude the presence of other compounds, materials, particles, method steps, even if the other such compounds, material, particles, method steps have the same function as what is named.

It is also to be understood that the mention of one or more method steps does not preclude the presence of additional method steps or intervening method steps between those steps expressly identified. Similarly, it is also to be understood that the mention of one or more components in a fabric or system does not preclude the presence of additional components or intervening components between those components expressly identified.

Referring now in detail to the drawing figures, wherein like reference numerals represent like parts throughout the several views, the present invention of **Figs. 1 and 4** provides a sheet **10** shown having dimensions of 102 inches in length and 91 inches in width. The material is manufactured from performance fabric, which can include, for example, varying amounts of one or more of Lycra, Coolmax, Thermax and Thermastat. In a preferred embodiment, the fabric is treated so that the fabric has antimicrobial properties. By using circular-knit performance fabric, the fabric is able to provide elasticity in all four directions. This property allows for the sheet to fit extraordinary mattress, cushion and bedding shapes, as well as providing better fits for traditional rectangular sheets. By using performance fabrics, the sheet has elastic properties that allow stretching in the directions shown as **30**. In addition, by using circular-knit performance