

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
Total in USD (\$)				180

Electronic Acknowledgement Receipt

EFS ID:	12507987
Application Number:	13272977
International Application Number:	
Confirmation Number:	4915
Title of Invention:	Fabric System
First Named Inventor/Applicant Name:	Susan Walvius
Customer Number:	26161
Filer:	Frank L. Gerratana/jennifer franco
Filer Authorized By:	Frank L. Gerratana
Attorney Docket Number:	29712-0002003
Receipt Date:	11-APR-2012
Filing Date:	13-OCT-2011
Time Stamp:	17:32:25
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$180
RAM confirmation Number	4584
Deposit Account	061050
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
		000702			

1	Non Patent Literature	2EP1_COMM_3_12_12.pdf	212882 259f97bfb77a4b0340ca86cdeb83a885bcafb8e51f	no	5
Warnings:					
Information:					
2	Non Patent Literature	2001_pendingClaims.pdf	52210 81025459d3e214cf3ee6bf40dcb3170f867e3f0b	no	6
Warnings:					
Information:					
3	Non Patent Literature	2002_PendingClaims.pdf	46964 c973b7ca29aad989ce091c88271c32ebe6a45342	no	5
Warnings:					
Information:					
4	Non Patent Literature	2001_TH.pdf	71578 c3cf2da93a4100cb338ce50da393a0b8461f0ef8	no	2
Warnings:					
Information:					
5	Non Patent Literature	2002_TH.pdf	69544 10709783474ba770d736a9d9898d5c28d64eb5f0	no	2
Warnings:					
Information:					
6		2003_IDS.pdf	129705 d14c683a8f1f109e4f31c3151ba7bd48f327f63e	yes	3
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Transmittal Letter		1	2	
	Information Disclosure Statement (IDS) Form (SB08)		3	3	
Warnings:					
Information:					
7	Fee Worksheet (SB06)	fee-info.pdf	29686 a54e448592b6c0775a970769c8e052f442120a50	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			612569		

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.	Art Unit :	3673
Serial No. :	13/272,977	Examiner :	Nicholas F. Polito
Filed :	October 13, 2011	Conf. No. :	4915
Title :	FABRIC SYSTEM		

MAIL STOP AMENDMENT

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

INFORMATION DISCLOSURE STATEMENT

Please consider the references listed on the attached PTO-1449 form.

Copies of United States patent documents will be provided upon request. Copies of all non-U.S. patent documents and other documents are enclosed.

The United States patent applications and/or patents listed below contain material related to material in this application. Copies of the applications and/or patents, their current claims (in the case of patents), and their transaction histories from the patent office public PAIR website are enclosed (or were provided previously with information disclosure statements identified in the table).

The applicant invites the examiner to consider the claims and claim amendments of these other applications and/or patents, and the positions of the examiners and the applicant that appear in their prosecution histories. The applicant understands that the examiner has direct access to these papers at the patent office, but will be happy to provide copies to the examiner upon request.

Applicant : Susan Walvius et al.
Serial No. : 13/272,977
Filed : October 13, 2011
Page : 2 of 2

Attorney's Docket No.: 29712-0002003

US serial number and filing date/ status	Examiner and group art unit	Is patent or application attached and listed on form 1449 and/or what is the date of a prior information disclosure statement with which it was submitted	In the case of an application, are claims attached or what is the date of a prior information disclosure statement with which they were submitted	Is current PAIR transaction history attached and listed on form 1449
61/101,049 09/29/2008 Expired	N/A	No	No	No
12/569,659 09/29/2009 Pending	Nicholas F. Polito GAU 3673	No - publication 2011/0000020 submitted 2/16/12	Yes	Yes
13/271,884 10/12/2011 Pending	Nicholas F. Polito GAU 3673	No - publication 2012/0024013 submitted 2/16/12	Yes	Yes

This statement is being filed after a first Office action on the merits, but before receipt of a final Office action or a Notice of Allowance. The fees in the amount of \$180 in payment of the late submission fee of \$1.17(p) are being paid concurrently herewith. In addition, please apply any other necessary charges or credits to Deposit Account 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: April 11, 2012 _____

/Frank L. Gerratana/ _____
Frank L. Gerratana
Reg. No. 62,653

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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

REPLY TO ACTION DATED JANUARY 6, 2012

Amendments to the claims (this listing replaces all prior versions):

1-13. (Cancelled)

14. (Currently Amended) A bed sheet comprising a fabric of a man-made fiber, the fabric having been knit at a high gauge, and the fabric having higher breathability, higher heat transfer, and higher moisture wicking characteristics than a cotton fabric.

15. (Previously Presented) The bed sheet of claim 14 wherein the fabric comprises a finished fabric comprising:
a first circular knitted fabric portion; and
a second circular knitted fabric portion;
at least one of the fabric portions comprising a performance fabric portion;
the first and second fabric portions being discrete and joined to form the finished fabric.

16. (Previously Presented) The bed sheet of claim 14, comprising piping.

17. (Previously Presented) The bed sheet of claim 15, wherein the first and second fabric portions have different fabric characteristics.

18. (Previously Presented) The bed sheet of claim 17, wherein at least one of the fabric characteristics comprises moisture management.

19. (Previously Presented) The bed sheet of claim 14 in which the fabric is knit of the man-made fiber.

20. (Previously Presented) The bed sheet of claim 14 in which the fabric has a gauge of at least 17 gauges.

21. (Previously Presented) The bed sheet of claim 14 in which the fabric is circularly knit.

22. (Previously Presented) The bed sheet of claim 14 being stretchable to fit either a baby crib and an adult bed.

23. (Previously Presented) The bed sheet of claim 14 that is sufficiently stretchable to fit a standard rectangular bed and a smaller, non-rectangular marine bed.

24. (Previously Presented) The bed sheet of claim 14 that is sufficiently stretchable to fit either a crib or a standard adult bed.

25. (Previously Presented) The bed sheet of claim 14 that is at least 90 inches wide.

26. (Previously Presented) The bed sheet of claim 14 having dimensions of approximately 102 inches in length and approximately 91 inches in width.

27. (Previously Presented) The bed sheet of claim 14 comprising a pull tie that can be cinched to increase tension around an edge of the bed sheet.

28. (Previously Presented) The bed sheet of claim 17, wherein at least one of the fabric characteristics is UV protection.

29. (Previously Presented) The bed sheet of claim 17, wherein at least one of the fabric characteristics is anti-microbial fabric.

30. (Previously Presented) The bed sheet of claim 17, wherein at least one of the fabric characteristics is thermo-regulation.

31. (Previously Presented) The bed sheet of claim 17, wherein at least one of the fabric characteristics is wind resistance.

32. (Previously Presented) The bed sheet of claim 17, wherein at least one of the fabric characteristics is water resistance.

33. (Currently Amended) A bed sheet comprising a ~~circularly knit~~ fabric circularly knit at a high gauge and including a high performance man-made fiber.

34. (Previously Presented) The bed sheet of claim 33 that is at least 90 inches wide.

35. (Previously Presented) The bed sheet of claim 33 in which the bed sheet comprises at least two portions of the circularly knit fabric.

36. (Previously Presented) The bed sheet of claim 33 in which the fabric comprises polyurethanepolyurea copolymer fiber.

37. (Previously Presented) The bed sheet of claim 36 in which the polyurethanepolyurea copolymer fiber is included in the fabric in a proportion such that, if circularly knit at a high gauge, the fabric could be knit at no more than a 72.5 inch circumference without losing integrity of the polyurethanepolyurea copolymer fiber.

38. (Withdrawn) A bed covered by a bed sheet comprising a fabric of a man-made fiber, the fabric having higher breathability, higher heat transfer, and higher moisture wicking characteristics than a cotton fabric.

39. (Withdrawn) The bed of claim 38 in which the fabric comprises comprising a circularly knit fabric.

40. (Withdrawn) The bed of claim 38 wherein the bed sheet is at least 90 inches wide.

41. (Previously Presented) A bed sheet comprising a fabric circularly knit of a man-made fiber, the fabric having a gauge of at least 17 gauges, and the fabric having higher breathability, higher heat transfer, and higher moisture wicking characteristics than a cotton fabric.

REMARKS

The applicant notes that a telephone interview was conducted on April 2, 2012, for related application no. 13/271,884. A summary of the interview is included in the response to the office action of January 4, 2012 for that application.

The comments of the applicant below are each preceded by related comments of the examiner (in small, bold type).

Double Patenting

3. Claims 14-25, 28-37 and 41 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-4 and 28 of copending Application No. 12/569,659 and claims 25-43 of copending Application No. 13/271,884.

The applicant will consider filing a terminal disclaimer once the pending claims have been found to be allowable.

Claim Rejections -35 USC § 102

5. Claims 14,15,17-19,21-24,28,30-33 and 35 are rejected under 35 U.S.C. 102(b) as being anticipated by Murphy et al. (U.S. Patent No. 6,823,548).
6. Regarding claim 14, Murphy et al. teach in Figures 1-3 and column 5, lines 46 to 67 a bed sheet comprising a fabric of a man-made fiber, the fabric having higher breathability, higher heat transfer, and higher moisture wicking characteristics than a cotton fabric.

Claim 14 has been amended to recite "the fabric having been knit at a high gauge." Murphy is not understood to describe or make obvious at least this feature of the claim.

Murphy is silent with regard to the gauge of the fabric. The rejection of claim 20 takes official notice with regard to the gauge of the fabric:

3. Regarding claim 20, Murphy et al. teach the bed sheet of claim 14. Murphy et al. do not teach wherein the fabric has a gauge of at least 17 gauges. The examiner takes official notice that it is commonly known in the art to use high gauge fabrics for bed coverings. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a gauge of at least 17, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

In response, the applicant contends that it would not have been obvious to one having ordinary skill in the art at the time the invention was made to use a high gauge, such as a gauge of 17, in a bed sheet comprising a fabric knit at a high gauge.

The inventors, Susan Walvius and Michelle Marciniak, set out to create a bed sheet that had higher heat transfer characteristics than cotton bed sheets and also had a smooth feel when touched. The inventors believed that to have these characteristics, a fabric that was knit would have to be knit at a high gauge.

The inventors searched for fabric suppliers who could produce a fabric at a high gauge having a width suitable for use as a bed sheet. They discovered that this could not be done by the fabric suppliers that they contacted. In particular, the contacted fabric suppliers who produced fabric suitable for bed sheets produced fabric at a low gauge, and fabric suppliers who produced fabric at a high gauge produced fabric suitable for clothing such as athletic apparel.

In response, the inventors conceived of producing a bed sheet containing fabric of a man-made fiber. The fabric would be knit at a high gauge and the fabric would have higher breathability, higher heat transfer, and higher moisture wicking characteristics than a cotton fabric. To the inventors' knowledge, even though narrow portions of fabric knitted at a high gauge already existed, none of the contacted suppliers of fabric had produced a fabric having these characteristics and having a width suitable for use as a bed sheet.

Once the inventors had conceived of producing a bed sheet containing fabric of a man-made fiber, the fabric having been knit at a high gauge, and the fabric having higher breathability, higher heat transfer, and higher moisture wicking characteristics than a cotton fabric, the inventors put this product on the market. The product, branded as "SHEEX Performance Sheets," has been successful in the marketplace.

Accordingly, in part because it would not have been obvious to one having ordinary skill in the art at the time the invention was made to produce a bed sheet comprising a fabric knit at a high gauge, amended claim 14 is patentable.

Amended claim 33 recites a "bed sheet comprising a fabric circularly knit at a high gauge" and is patentable for reasons similar to those given for claim 14.

Claim Rejections -35 USC § 103

1. Claims 16, 20, 25, 26, 34 and 41 are rejected under 35 U.S.C. 1 03(a) as being unpatentable over Murphy et al.

Claims 16, 20, 25, 26 depend from claim 14 and are patentable for at least the same reasons as given for claim 14.

Claim 34 depends from claim 33 and is patentable for at least the same reasons as given for claim 33.

Claim 41 recites a "bed sheet comprising a fabric circularly knit of a man-made fiber, the fabric having a gauge of at least 17 gauges," and is patentable for reasons similar to those given for claim 14.

31. Claim 29 is rejected under 35 U.S.C. 1 03(a) as being unpatentable over Murphy et al. in view of Porter et al. (U.S. Patent No. 4,690,859).

Claim 29 depends from claim 14 and is patentable for at least the same reasons as given for claim 14. Porter is not understood to remedy the deficiencies of Murphy.

33. Claim 36 is rejected under 35 U.S.C. 1 03(a) as being unpatentable over Murphy et al. in view of Link et al. (U.S. Pub. No. 2007/0283493).

Claim 36 depends from claim 33 and is patentable for at least the same reasons as given for claim 33. Link is not understood to remedy the deficiencies of Murphy.

Allowable Subject Matter

1. Claim 37 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The applicant thanks the examiner for the indication of allowable subject matter.

All of the dependent claims are patentable for at least similar reasons as those for the claims on which they depend are patentable.

Canceled claims, if any, have been canceled without prejudice or disclaimer.

Any circumstance in which the applicant has (a) addressed certain comments of the examiner does not mean that the applicant concedes other comments of the examiner, (b) made arguments for the patentability of some claims does not mean that there are not other good reasons for patentability of those claims and other claims, or (c) amended or canceled a claim

Applicant : Susan Walvius et al.
Serial No. : 13/272,977
Filed : October 13, 2011
Page : 9 of 9

Attorney's Docket No.: 29712-0002003

does not mean that the applicant concedes any of the examiner's positions with respect to that claim or other claims.

Please apply any charges or credits to deposit account 06-1050, referencing attorney docket 29712-0002003.

Respectfully submitted,

Date: April 6, 2012_____

/Frank L. Gerratana/_____
Frank L. Gerratana
Reg. No. 62,653

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

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Electronic Acknowledgement Receipt

EFS ID:	12488778
Application Number:	13272977
International Application Number:	
Confirmation Number:	4915
Title of Invention:	Fabric System
First Named Inventor/Applicant Name:	Susan Walvius
Customer Number:	26161
Filer:	Frank L. Gerratana/jennifer franco
Filer Authorized By:	Frank L. Gerratana
Attorney Docket Number:	29712-0002003
Receipt Date:	06-APR-2012
Filing Date:	13-OCT-2011
Time Stamp:	15:12:26
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Response.pdf	91579 <small>4715d8ca502cde26feffdfed3bb13158ea09081</small>	yes	9

Multipart Description/PDF files in .zip description			
Document Description		Start	End
Amendment/Req. Reconsideration-After Non-Final Reject		1	1
Claims		2	5
Applicant Arguments/Remarks Made in an Amendment		6	9

Warnings:

Information:

Total Files Size (in bytes):	91579
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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

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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.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/272,977	Filing Date 10/13/2011	<input type="checkbox"/> To be Mailed
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APPLICATION AS FILED – PART I			OTHER THAN SMALL ENTITY				
(Column 1)		(Column 2)	SMALL ENTITY <input type="checkbox"/>		OR	SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)		RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A			N/A	
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A			N/A	
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A			N/A	
TOTAL CLAIMS <small>(37 CFR 1.16(j))</small>	minus 20 =	*	X \$ =		OR	X \$ =	
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =			X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 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).						
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II					OTHER THAN SMALL ENTITY				
(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	SMALL ENTITY		
AMENDMENT	04/06/2012	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)	
	Total <small>(37 CFR 1.16(i))</small>	* 28	Minus	** 28	=	0	OR	X \$60=	0
	Independent <small>(37 CFR 1.16(h))</small>	* 4	Minus	***4	=	0	OR	X \$250=	0
<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>									
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

APPLICATION AS AMENDED – PART II					OTHER THAN SMALL ENTITY				
(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	SMALL ENTITY		
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)	
	Total <small>(37 CFR 1.16(i))</small>	*	Minus	**	=		OR	X \$ =	
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus	***	=		OR	X \$ =	
<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>									
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* 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 number found in the appropriate box in column 1.

Legal Instrument Examiner:
/ROLITA WIMBUSH/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
 If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Substitute Form PTO-1449 (Modified) Information Disclosure Statement by Applicant (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. 13/272,977
	Applicant Susan Walvius et al.		
	Filing Date October 13, 2011		Group Art Unit 3673

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	1	5,765,241	1998-06-16	Macdonald			
	2	5,817,391	1998-10-06	Rock et al.			
	3	6,381,779	2002-05-07	Thompson			
	4	2011/0000020	01-2011	Walvius et. al.			
	5	2012/0024013	02-2012	Walvius et. al.			
	6	4,648,186	03-1987	Dolman et al.			
	7	5,092,088	03-1992	Way			
	8	5,636,380	06-1997	Schindler et al.			
	9	7,117,695	10-2006	Laycock et al.			
	10	2008/0028523	02-2008	Robertson et al.			
	11	2007/0266495	11-2007	Stribling			
	12	2004/0172754	09-2004	Brooks et al.			

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
	13	CN102245822A	11/16/2011	China			X	
	14	JP 11-309183	11/9/1999	Japan			X	

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	15	Canadian office action issued January 16, 2012 in Canadian application no. 2,738,658 (4 pages).
	16	European communication mailed May 27, 2011 from European application no. 09817024.4 (2 pages).
	17	Response to European communication mailed May 27, 2011 from European application no. 09817024.4 filed November 22, 2011 (12 pages).
	18	Pending claims of U.S. application no. 12/569,659 as of February 15, 2012.
	19	Pending claims of U.S. application no. 13/271,884 as of February 15, 2012.
	20	Transaction history from PAIR of U.S. application no. 12/569,659 as of February 15, 2012.
	21	Transaction history from PAIR of U.S. application no. 13/271,884 as of February 15, 2012.

Examiner Signature	Date Considered
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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.

Substitute Form PTO-1449 (Modified) Information Disclosure Statement by Applicant (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. 13/272,977
	Applicant Susan Walvius et al.		
	Filing Date October 13, 2011	Group Art Unit 3673	

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	22	International Preliminary Report on Patentability from PCT application no. PCT/US2009/058716 mailed April 7, 2011 (6 pages).
	23	International Search Report from PCT application no. PCT/US2009/058716 mailed April 29, 2010 (3 pages).
	24	Written Opinion from PCT application no. PCT/US2009/058716 mailed April 29, 2010 (4 pages).
	25	European Communication mailed February 16, 2012 from European application no. 09817024.4 (4 pages).

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.	



Espacenet

Bibliographic data: CN102245822 (A) — 2011-11-16

FABRIC SYSTEM

Inventor(s):

Applicant(s):

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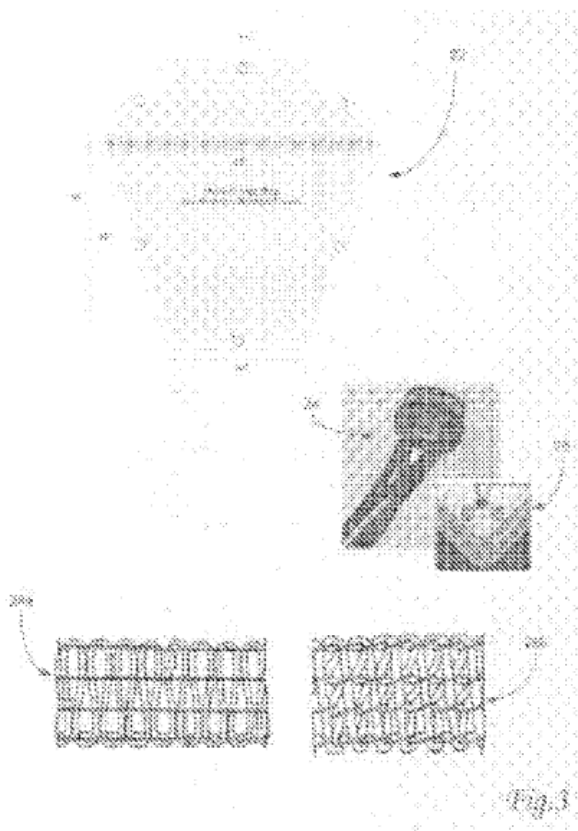
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Bedding material including a first fabric section manufactured from performance fabric and having a first and second side; and, a second fabric section attached to the first side of the first fabric section. Additionally, a third fabric section can 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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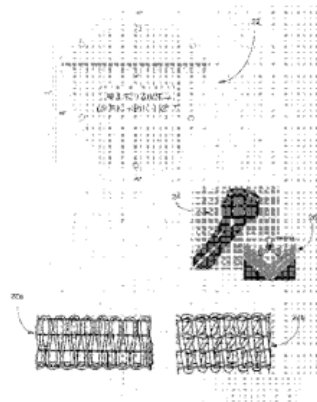
权利要求书 1 页 说明书 6 页 附图 4 页

(54) 发明名称

织物系统

(57) 摘要

寝具材料, 包括第一织物部分和第二织物部分, 所述第一织物部分用性能织物制成并具有第一侧面和第二侧面, 所述第二织物部分附着在所述第一织物部分的所述第一侧面上。另外, 还可在所述第一织物部分的第二侧面上附着第三织物部分。所述第一织物部分可通过平式锁缝线迹附着在第二织物部分上。所述第一织物部分可包括第一区域和第二区域, 其中所述第一区域包含不同于第二区域的功能特性, 而且所述第一区域可具有芯吸散热或散湿特性。



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1. 一种制造至少 90 英寸幅宽成品织物的方法,该方法包括:
形成至少两个分离的性能织物部分;和
结合至少两个分离的性能织物部分以形成成品织物。
2. 权利要求 1 所述的方法,其中所述形成至少两个分离的性能织物部分包括针织至少两个分离的性能织物部分。
3. 权利要求 1 所述的方法,其中所述形成至少两个分离的性能织物部分包括圆形针织至少两个分离的性能织物部分。
4. 权利要求 1 所述的方法,其中所述结合至少两个分离的性能织物部分以形成成品织物包括将至少两个分离的性能织物部分缝合在一起,以形成成品织物。
5. 制造至少 90 英寸幅宽成品织物的方法,该方法包括:圆形针织至少两个分离的性能织物部分;并将至少两个分离的性能织物部分缝合在一起,以形成成品织物。
6. 权利要求 5 所述的方法,其中所述成品织物包括床单。
7. 权利要求 5 所述的方法,该方法还包括热定形整理该成品织物。
8. 权利要求 5 所述的方法,该方法还包括对成品织物进行滚边。
9. 一种用性能织物制造幅宽至少 90 英寸床单的方法,该方法包括:
圆形针织至少两个分离的性能织物部分;
将至少两个分离的性能织物部分缝合在一起;以及
对缝合后的至少两个分离的性能织物部分进行热定形整理,以形成成品床单。
10. 权利要求 9 所述的方法,该方法还包括对成品床单进行滚边。
11. 权利要求 9 所述的方法,其中所述至少两个分离的性能织物部分的织物特征不同。
12. 权利要求 11 所述的方法,其中织物特征选自水分控制、紫外线防护、抗微生物、热调节、挡风和防水组成的组中。
13. 一种幅宽至少 90 英寸的成品织物,该织物包括:
第一圆筒形针织性能织物;和
第二圆筒形针织性能织物;
其中第一性能织物和第二性能织物是分离的织物;而且
其中第一性能织物和第二性能织物相连以形成成品织物。
14. 权利要求 13 的成品织物,其中所述成品织物包括床单。
15. 权利要求 13 的成品织物,该方法还包括滚边。
16. 权利要求 13 的成品织物,其中第一性能织物和第二性能织物的织物特征不同。
17. 权利要求 16 的成品织物,其中织物特征选自水分控制、紫外线防护、抗微生物、热调节、挡风和防水组成的组中。

织物系统

技术领域

[0001] 本发明总体上涉及织物系统,更具体地涉及由高织针号圆形针织物构成的床罩,该床罩调节并保持最佳睡眠温度条件,这些条件又能诱发快速入睡并使睡眠更深、更具恢复性。

背景技术

[0002] 根据国家睡眠基金会(NSF)的研究,睡眠问题在美国非常普遍,它影响着大约四分之三的美国成年人。因此,人们对睡眠差的状况和如何提高睡眠质量的对策都已给予很大关注。

[0003] 结论并非纯粹学术性的。睡眠 - 不仅需要量而且还需要合宜质量 - 不只是逐日行为表现,而且按照 NSF 的研究,也是“我们生活的总质量”。因此,考虑低质量睡眠的原因有着数以百万计的结果。

[0004] 虽然许多因素促进了睡眠质量,但睡眠环境本身起着决定性的作用,而且睡眠研究人员通常强调把温度作为最佳睡眠的一个最重要的组成部分。正如马里兰大学医疗中心所建议的那样,“凉爽(非寒冷的)卧室常常最有助于睡眠”。国家睡眠基金会还指出,“温度超过 75 华氏度和低于 54 华氏度会扰乱睡眠”,根据 NSF 的研究,65 度是大多数个体的理想睡眠温度。

[0005] 较低的环境温度不是与改进睡眠有联系的唯一热因数。研究人员已曾指出,健康人、正常成年人夜间睡眠时体温降低。据康奈尔大学的医学研究人员研究,这个自然循环,当受到制止或不恰当运行时,会扰乱睡眠和延迟睡眠起始。相反,研究人员注意到,体温迅速下降不但加速睡眠起始,而且也“可促进进入更深的睡眠”。

[0006] 因此,保持适当凉爽的睡眠环境并提供人体夜晚自身凉爽的自然趋势,应该是关注最佳自身睡眠质量的个人最优先考虑的事。精巧制作成寝具敷覆物的性能织物尤能促进凉爽、舒适 - 并因此更好的 - 睡眠,因为这些高级织物能使透气性和传热性最大化。性能织物应诸多终极用途而制造,可提供多重功能质量,例如水分控制、紫外线防护、抗微生物、热调节和挡风 / 防水。

[0007] 在一些工业中,早就需要改进寝具,以助个体睡得更好。除了别的性质以外,这种改进的寝具还将包括有益的芯吸特性。例如,在海上驾艇和娱乐车应用中,寝具应该抵御潮湿,配合异形床垫和床,并减少长霉。特别使用水运工具,存在着保护寝具,特别是床单不受潮、不长霉斑的需求。

[0008] 寝具的另一个不仅涉及船舶与休闲车辆的问题,是粘湿感,这种粘湿感可能发生在床单被体汗、环境湿气或者其他体液弄湿的时候。尤当暑热天气使用寝具时,或者病人连续很长时间使用寝具时,就会出现这些问题,因为棉纤维等制的传统床单不能充分吸收湿气。所有这些问题都会导致睡眠质量差。

[0009] 迄今为止,性能织物制成的寝具产品不为人知。制造高织针号圆筒形针织物时幅宽受到限制,这是因为寝具织物的成品幅宽由织造时所用织机支配。现时,受现有制造与技

术上的限制,又加上替代的制造工艺无能力制造性能属性等同的织物,所以性能织物以小于 90 英寸的最大幅宽来制造。然而,正常床单的幅片尺码可为 102×91 英寸或更大。因此,性能织物尚不能用于床单。

[0010] 上述妨碍夜间优质睡眠问题的一些常规解决方案包括美国专利 4,648,186,该文件公开了一种吸收性木浆纤维素纤维,它以各种各样的尺寸供给并置于床垫下面。这种木浆是水吸收剂,并起着收集湿气以防这样的湿气被寝具或床单吸留的作用。然而,所建议的这一解决方案不对寝具或床单发生作用,而对接近于目标寝具的湿气仅仅起到海绵的作用。

[0011] 美国专利 5,092,088 公开了一种像床单的铺垫,该铺垫由垫套组成,其内部被分成多个像袋子的空间,干燥剂挤入袋子中,并用这样的方式容纳在像袋子的空间中,致使干燥剂不能从像袋子的空间里掉出来。硫酸镁、高聚物吸收剂、硅胶等均可用作干燥剂。如可见的那样,所建议的这个寝具中湿气的解决方案繁琐不便,而且基于化学原理。

[0012] 在运动服装工业中,湿气通过毛细作用带走的织物已用来加工运动服。例如,美国专利 5,636,380 公开了一种 CoolmaxQ 高蒸湿织物底布,该底布具有一块或多块 ThermaxB 隔热板或者 ThermastatQ 中空型芯纤维织物,该中空型芯纤维织物具有通过毛细作用带走湿气的能力,并应用于需要保护肌肉的所选身体部分接触皮肤的衣服内侧上。然而,由于所制性能织物的尺寸限制,这样的应用不适于床单。此外,由于纤度细得以至于缝合这种织物会导致缝合干脆散架,所以像这种类型的性能织物不能容易地缝合在一起。

[0013] 圆形针织通常用于运动服。此工艺包括将纱循环针织到织物中。圆形针织是一种将织针编组成圆形针床的纬编形式。圆筒旋转并与凸轮相互作用,往复传送织针来进行成圈动作。将待针织的纱从卷装供入导纱器板,该导纱器板把纱股对准织针。圆形织物经由圆筒的中心以管状形式从织针产生出来。美国专利 7,117,695 中记述了这一工艺。然而,用于这种制造方法、目前可购得的机器只能制造最大幅宽约 90 英寸的织物。因此,无人知晓这种工艺可制造床单,这是因为床单的尺寸可为 91 英寸 × 102 英寸或更大。

[0014] 另外,用来制造寝具的机器还与制造运动服的机器颇不相同。例如,寝具制造设备不配备缝纫平式锁缝线迹或者提供圆形针织。床单通常用一种通称为经编的方法针织而得,这是一种能按寝具所需幅宽制造成品布的方法。然而,这种方法不能用来制造优质性能织物。举例来说,经编不能复制这些织物的细微触觉品质,也不能复制其全方位延伸特性。

[0015] 圆形针织可用来制造能保持这些织物全部裨益与优点的性能织物。然而,为了制造一种适合寝具应用幅宽的织物,直径至少为 48 英寸的圆筒形针织机将是必要的。因此,制造的限制规定阻止了以合适寝具幅宽织造性能织物。即使可容易得到机器,产业对能否实际上针织并然后以这些大尺寸完成性能织物也仍缺乏信心。

[0016] 另外,运动服缝制工厂通常不配备能缝纫与处理大的织物碎片,所以设备上的限制不允许制造床单。

[0017] 因此,需要的是一种利用性能织物及其有益特性的寝具系统,这种系统的设计肯定并考虑到这些织物制造中的局限性。本发明主要指向的就是这样一种系统。

发明内容

[0018] 以优选方式简单地说,本发明是一种供寝具之用的高织针号圆筒形针织物,也是

一种用于制造这种寝具的方法。这种寝具织物具有优异的功能特性,而且还能用目前可得到的、目前使用中的机器来制造。为了实现制造床单尺码的性能织物所需的成品幅宽尺码,必需有直径至少为 48 英寸的高织针号圆筒形针织机。而且当能得到可制造较宽织物的经编机时,这种方法不会提供所需触觉品质的织物,也不提供全方位延伸的织物。

[0019] 在一示例性实施例中,本发明是一种制造成品布的方法,该成品布包括至少两个分离的性能织物部分,并将至少两个分离的性能织物部分缝合起来,形成成品布。形成所述至少两个分离的性能织物部分可包括针织至少两个分离的性能织物部分,而且更优选圆形针织至少两个分离的性能织物部分。缝合至少两个分离的性能织物部分来形成成品织物,这可包括将至少两个分离的性能织物部分缝合在一起,以形成成品织物。

[0020] 所述至少两个分离的性能织物部分可具有不同的织物特征。本文中所用的织物特征尤其包括水分控制、紫外线防护、抗微生物、热调节、挡风以及防水。

[0021] 连同其他应用一道,所述成品织物可用于居室配置,或者在海洋环境中、在船和娱乐车环境中。

[0022] 现有床单与传统的棉寝具相比,提供了增强的悬垂性和舒适感,而且精细如丝,却仍提供高弹性和复原的益处,外加比传统棉寝具优异的透气性、体温传导性以及水分控制。

[0023] 传统的配套的床单可在标准床垫尺寸上集束和滑动。此外,如若配套的床单不匹配,则这些床单还不提供可依赖的光滑表面。本发明克服了这些问题。

[0024] 现有高织针号圆筒形针织物可伸缩得能在床垫上调整并提供优异的复原,使织物能顺应床垫调整而不跳出床垫的拐角或波浪形拐角。所述性能织物可包含斯潘德克斯弹性纤维 (spandex),提供比传统寝具产品更加好的适配,能够以单一尺码的床单容纳更大或较小的床垫尺寸,并能以各种各样的奇怪尺寸适应床垫。

[0025] 斯潘德克斯弹性纤维 (Spandex) - 或弹性纤维 - 是一种合成纤维,因其卓越的弹性而著称。它比橡胶 (其主要的非合成竞争对手) 更坚固,而且更耐用。它是 DuPont 公司发明的一种聚氨酯 - 聚脲共聚物。“潘德克斯弹性纤维”是一种类名,而且是“expands”这个词的音节倒序词。“Spandex”是北美洲的优选名称;其它地方称为“elastane”。与 spandex 有关的最著名品牌名是 Lycra,它是 Invista 公司的商标。

[0026] 现有高织针号圆筒形针织物与其他针织技术相比,在减少起球和牵扯方面提供了耐用性,并提供减少的折皱和增强的固色性。

[0027] 在一种优选实施例中,现有性能织物能够允许单一尺码适配的床单实际上适配两种不同尺寸的床垫。举例来说,本发明的原尺寸适配床单能在普通双人床和大号的床上都适配。本发明的双人床适配床单也将适配 XL 双人床。在航船应用中,可制造本发明织物来适配几乎所有的常规船用床垫。

[0028] 在北卡罗莱纳州立大学 (NCSU) 纺织品防护和舒适性研究中心进行的测试证实了本发明性能织物提供比棉更为凉爽的睡眠环境。在一系列设计成能测量各产品传热特性和传湿特性以及暖和 / 凉爽到接触热输送能力的程序中,功能寝具与市售棉床单并行测试。

[0029] 通过所有测试,本发明性能织物在寝具方面工作性能比棉好,证实该性能织物在建立和保持睡眠期间热舒适方面的优越性。如 NCSU 测试指出,用户从初始起就明白这一优点,通常本发明的功能寝具提供了改进的皮肤初次接触时的传热性,导致凉爽触感。

[0030] 睡眠期间,本发明高织针号圆筒形针织功能寝具由于吸收较少体热且比棉透气更

好而有助于保持热舒适性。测试已证实,由性能织物制成的功能寝具从身体传走热的效率比棉高达两倍以上。这不仅对维持睡眠期间舒适至关重要,而且对身体能尽快凉下来以促进入睡也是至关重要的。除少吸热之外,功能寝具透气性比棉高—高至 50%,在通风和散热、排湿诸方面赋予功能寝具一种重大优点。

[0031] 对模拟干、湿皮肤条件而言,优于棉的性能优点证实了在控制湿气(例如出汗)以保持热舒适时,某些性能织物在寝具方面比棉更适合。除通过毛细作用从皮肤带走湿气之外,性能织物的先进透气性还能通过蒸发冷却来散热、散水分。结果,使用者保持凉爽、干燥,而且比棉更舒适。

[0032] 本发明功能寝具在能调节并保持最优睡眠热况方面比棉保有显著的优点,这个优点又能导致更快入睡和更深、更有助于复元的睡眠。

[0033] 结合附图阅读以下详细说明后,本发明的这些目的及其他目的、特点和优点就会更加明显。

附图说明

[0034] 图 1 示出本发明的一种优选实施例。

[0035] 图 2 示出本发明的另一种优选实施例。

[0036] 图 3 示出本发明的再一种优选实施例。

[0037] 图 4 示出本发明的另一种优选实施例。

具体实施方式

[0038] 虽然详细说明了本发明的各优选实施例,但须理解的是,其他实施例也属考虑之列。因此,不意在将本发明的范围限制于下列说明中所述或附图中所举例说明的结构细节和零件排列。本发明能采用其他实施例,并能以各种方式实际操作或者贯彻。同样,为明晰起见,在记述各优选实施例时,将借助特定术语。

[0039] 同样须注意的是,除上下文另行清楚指示外,说明书和所附权利要求中所用单数形式“一”、“一个”和“该”还包括所谈及事物的复数。举例来说,提及一个床单或者一部分也意在包括多个床单或者部分的制造。提及床单包含“一种”组分,除已定名的组分之外,也意指包括其他的组分。

[0040] 同样,为明晰起见,在记述各优选实施例时,将借助术语。各术语考虑到所属领域技术人员认为的最宽广含意,并包括技术上的各种等效替代物,这些等效替代物以类似方式起作用来实现相似的目的。

[0041] 本文中,范围区间可表达成从“约”或“大致”一个特定值和 / 或到“约”或“大致”另一个特定值。表达这种范围区间时,另一个具体方式包括从一个特定值和 / 或到另一个特定值。

[0042] “包括”或“包含”或“包括有”意指至少所提名的化合物、元素、微粒,或者存在于组合物或者物品或者方法中的方法步骤,但是不排除其他化合物、原料、微粒方法步骤的存在,即使另一种这样的混合、原料、微粒、方法步骤具有与已提及名称者同样的作用。

[0043] 还须理解的是,提及一个或多个方法步骤并不排除另外方法步骤的存在或者在那些清楚地鉴别的步骤之间插进一些方法步骤。同样,还须理解的是,提及织物或系统中一个

或多个组成部分,并不排除另外组成部分的存在或者在明确识别的组成部分之间插入一些组成部分。

[0044] 接下来详细参照附图,附图各视图中同样的附图标记始终代表同样的组成部分,图 1 和图 4 的本发明提供一种床单 10,图中示明尺寸为长 102 英寸、宽 91 英寸。材料用性能织物制成,可包括,举例来说,Lycra、Coolmax、Thermax 和 Thermastat 中的一种或多种,数量可变。在一种优选实施例中,对该织物进行处理,使之具有抗微生物特性。使用圆形针织性能织物时,该织物能产生四个方向上的全方位弹性。这种特性允许床单适配形状异乎寻常的床垫、坐垫和寝具,而且还能适配传统的长方形床单。使用性能织物时,床单具有弹性,这种弹性允许在表示为 30 的各方向上伸缩。另外,由于使用圆形针织性能织物,得到的寝具保持异常精细的触觉品质,这对最大程度增强舒适是至关重要的。

[0045] 非圆形针织例如经编可代替圆形针织。此方法能实现比圆形针织大的幅宽。工业经编针织机,例如能够制造宽度达 130-140 英寸的特里科经编针织物。然而,由于圆形针织要求较少准备时间,所以成本较低。同样,圆形针织也提供较大的多方向伸缩变化。

[0046] 为了提供一种可用市售圆型针织机制造、超过织物最大尺寸的床单,用平式锁缝线迹 12 来缝合多个部分,结果形成 91 英寸宽的床单(如图所示)。在一示例性实施例中,滚边 11 可包括在紧接线迹之处的范围内。线迹的颜色可与床单部分上织物的颜色相同,或可不同。滚边可为 3/4 英寸的直滚边,不含塞绳或者其他填充物。在一种优选实施例中,线迹是每英寸 16 针。滚边 11 可包括在床单的一端上,并可与床单织物同色或者不同色。

[0047] 对适配床单而言,该床单可包括弹性部分,该弹性部分围绕适配床单的边缘,以便在将该适配床单置于床垫或者其他睡眠表面时,能更好地将适配床单保持在适当的位置上。适配床单的边缘可缝入塞绳,并环绕床垫或其他睡眠表面捆紧,以更好地将适配床单固定在适当位置上。

[0048] 参照图 2,图中示明一种床单,其宽为 91 英寸,长为 102 英寸。在此实施例中,示明线迹 14 距离主要部分 16 上的内缘 18 为 34 英寸,而另一个线迹 14 则在缝合部的边缘 20 上。线迹可使用平式锁缝线迹。滚边可用在线迹上或者用在线迹附近。

[0049] 参照图 3,图中示明一种非长方形形状的床单。在该示例性实施例中,可包括环绕适配床单边缘的弹性带,以便当适配床单置于睡眠表面上时,更好地将适配床单保持在适当位置上。在一种实施例中,可将拉系带(pull ties)24 安置在环绕适配床单边缘的不同位置上,以帮助将适配床单保持固定在睡眠表面上。可抻紧所述拉系带来增大适配床单的边缘周围的张力,如图中 26 所示。

[0050] 用来把床单各个部分固定在一起的线迹可包括 28a 所示的线迹。在另一种实施例中,用来将织物各个部分固定在一起的线迹为图中 28b 所示的线迹。

[0051] 参照图 4,图中示明发明的又一种优选实施例。在此实施例中,床单可凭借不同织物的线迹组合起来,以在床单中形成一些功能区域。举例来说,区域 32 可比另一些区域具有较高的芯吸特性,因为这个区域是大多数个体躺卧之处。区域 34a 直至 34d 可具有较高的斯潘德克斯弹性纤维或者其他的弹性织物特性,所以改进了围绕睡眠表面的适配。区域 36 可具有例如增进凉爽的热力学特性,因为这个区域通常是个体头部枕置的地方。在一示例性实施例中,个体用的枕套同样具有不同于床单其余部分的特性,例如热力学特性。

[0052] 本发明包括寝具材料的构成,这类材料具有优异功能特性,同时又可用目前市售

和使用着的机器来制造。更具体地说,本发明涉及一种制造寝具中罩套及 / 或床单的新方法。当使用圆型针织机时,在不损失织物中斯潘德克斯弹性纤维的完整性的情况下,高织针号性能织物只能制成 72.5 英寸的最大尺寸。可是,正常床单的幅片尺码是 102×91 英寸。当用性能织物制造床单时,这就会出现这个问题。

[0053] 另外,考虑到织物的纱线密度,必须使用特定线迹技术。使用这种特定线迹把幅片缝在一起,以便制造适合标准床单尺码的寝具或床单。因为用分离的部分 / 幅片来制造本发明织物,所以可为不同的寝具区域选择幅片来提供不同特性(图 4)。床单上的线迹或接缝也使寝具能易于制造。因为寝具由含斯潘德克斯弹性纤维的性能织物组成,所以它可伸缩变化,以容许多重和常规尺寸定位,供婴儿床、娱乐车和船上应用。

[0054] 用来制造高织针号功能寝具织物的圆型针织机,由于能用细纱密实针织,故而被称作高织针号圆型针织机。高织针号通常指织针号 17 以上。织针号 17 指的是 1 英寸长度上排列 17 或更多个针筒针。小于织针号 17 的圆型针织机称为低织针号圆型针织机。低织针号圆型针织机常用来作针织外衣。

[0055] “纱支”指的是纱已纺到的线密度(纱直径或细度)。纱支的选择受所用针织机种类和针织结构的限制。纱支又影响成本、重量、不透明性、手感和所得的针织组织的悬垂性。通常,切段纤维所纺纱的支数越细就具有越贵的趋势,因为要防止纱外观不规则,纤维必需更细,而且纺纱方法必需更精确。

[0056] 虽然性能织物中斯潘德克斯弹性纤维含量越高就越有拉伸幅宽的倾向,但目前仍可用 36-38 英寸直径的织机上形成的圆筒形针织物制得 90 英寸范围内的顶宽。仅举一例,在 30 英寸直径织机上,斯潘德克斯弹性纤维可将另一种 94 英寸周长圆筒形针织物减到成品幅宽为 60-65 英寸的圆筒形针织物。

[0057] 成品幅宽的主要局限性不绝对关系到针织工艺,而且还与织物整理有关。性能织物在中间部有下垂倾向 - 较大幅宽时愈加下垂 - 这使织物整理难得不可能超出某一阈值。可能的 90 英寸成品幅宽随一种能处理本发明性能织物的优良的织物整理方案而定。在对床单要求更大幅宽的条件下,这种潜在困难只会变得错综复杂。

[0058] 在一种优选工艺中,本发明织物经历热定形整理工艺。将毛细吸湿整理运用到另一织物 - 例如可按较大幅宽制造的棉织物 - 就显现出不能与本发明织物的湿度控制特性匹配,因为聚酯本身天然防潮并在使用时起着物理作用(例如毛细管作用)。另外,用棉会损耗透气性与传热能力(正如实验室试验所证实的那样)以及可拉伸性。

[0059] 前面的说明中已连同结构细节与作用阐述了许多特征和优点。虽然已以若干形式公开了本发明,但所属领域技术人员会明白,其中可进行许多变更、增补和省却,特别是形状、尺码和组成部分的排列,而不会背离本发明的实质和范围,其等效替代物如所附权利要求书所述。因此,可由本说明书中技术活动规范建议的其他变更或实施例在属于所附权利要求书广度和范围内尤可备用。

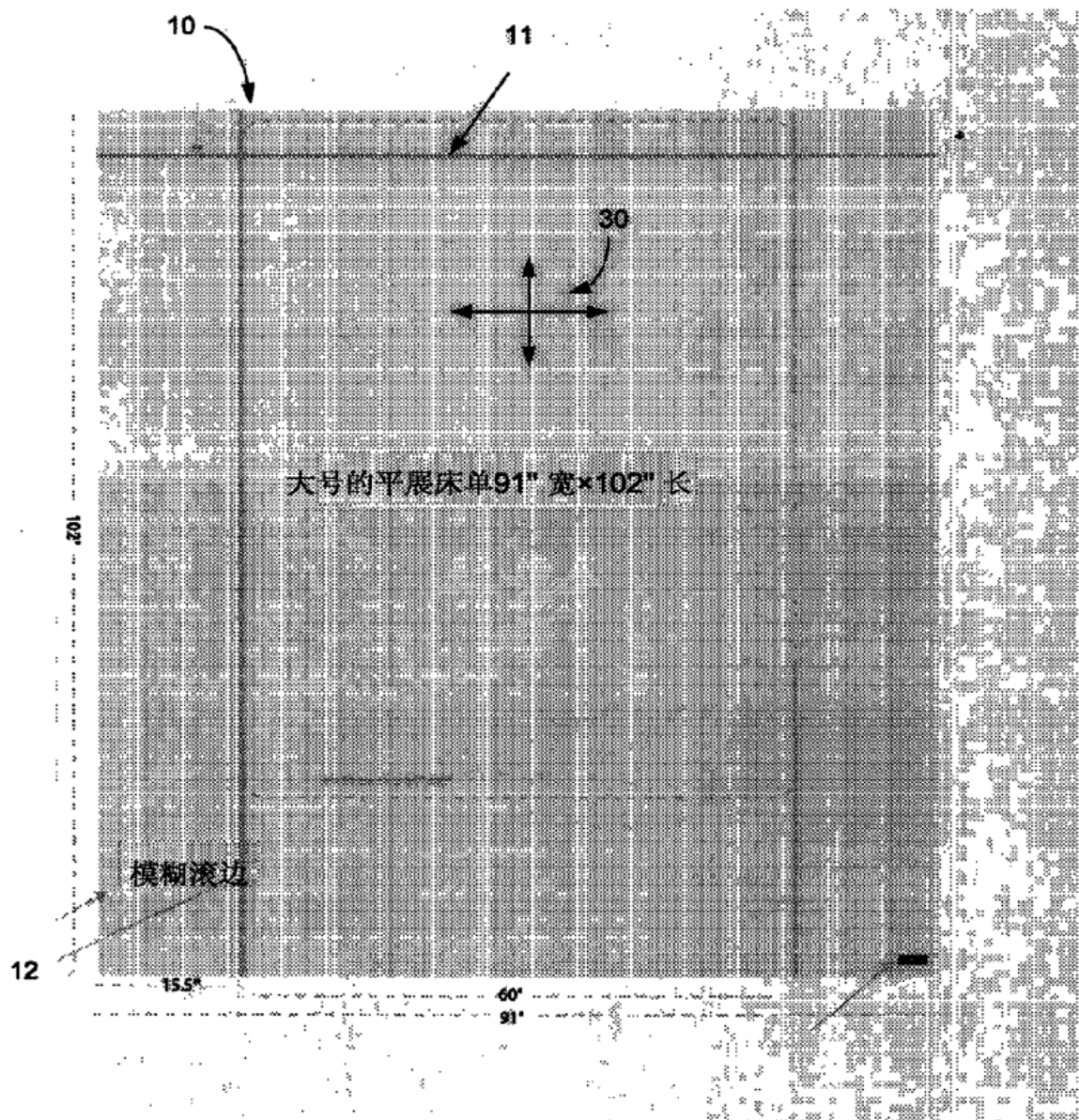


图 1

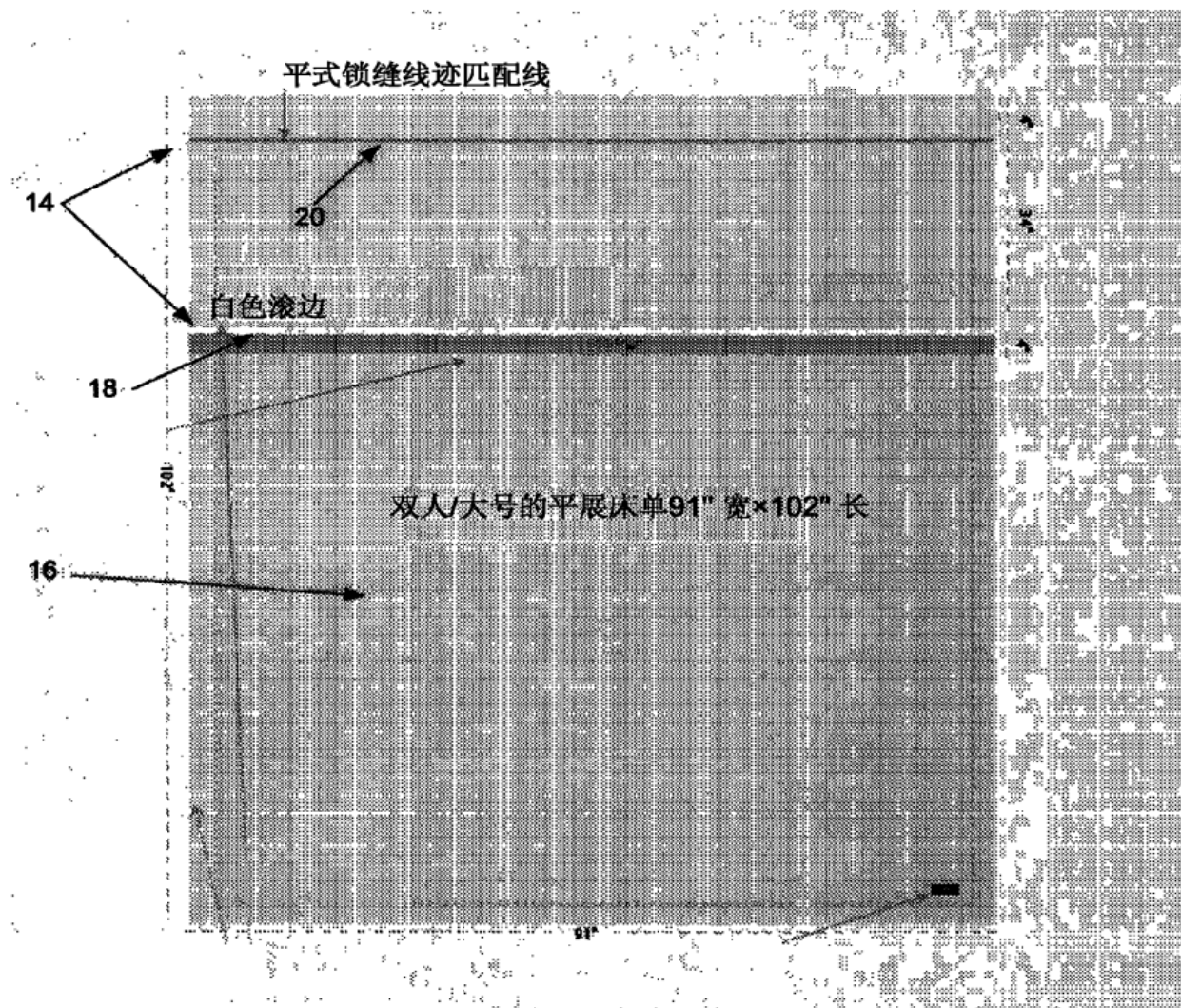


图 2

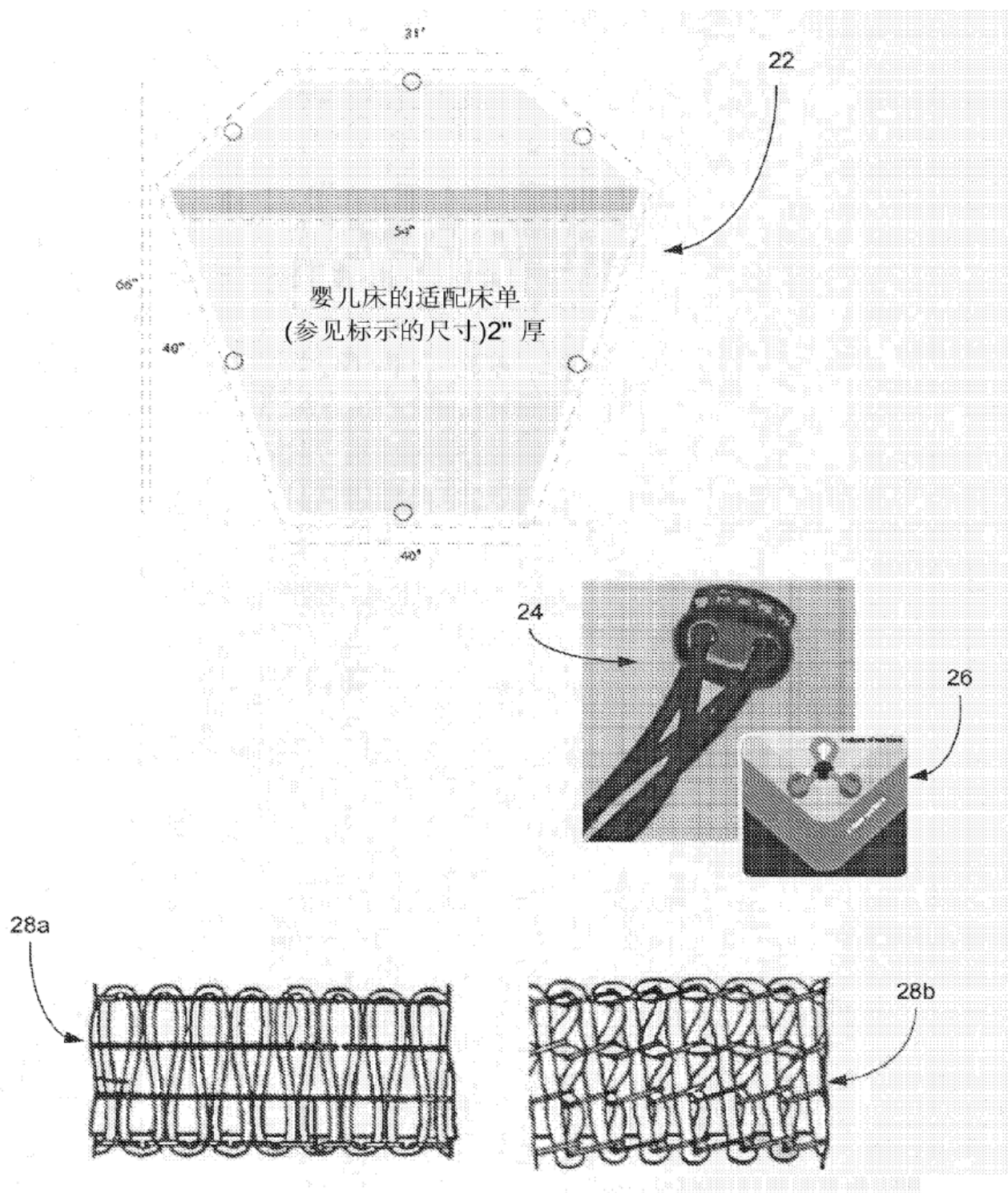


图 3

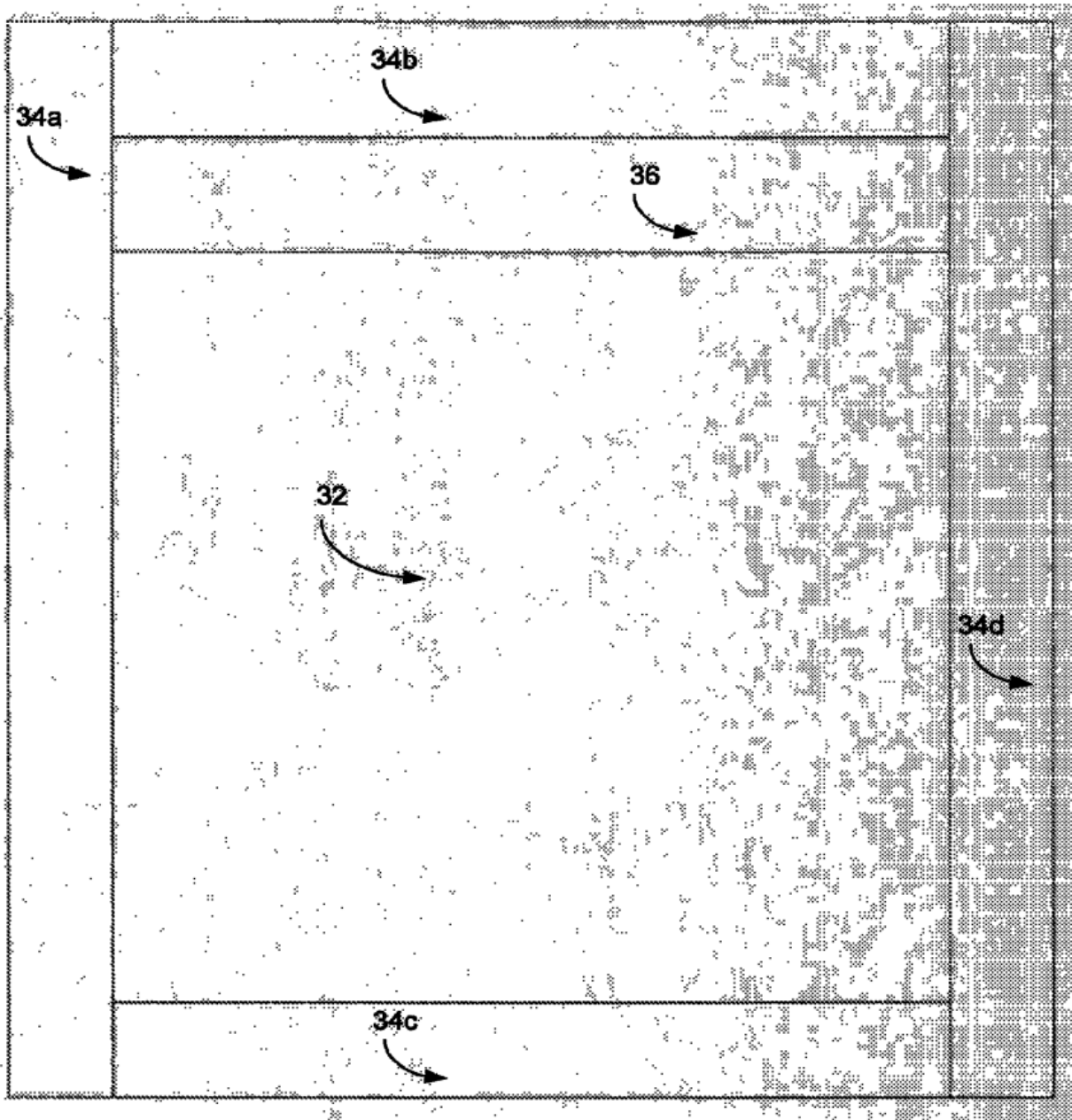


图 4

PATENT ABSTRACTS OF JAPAN

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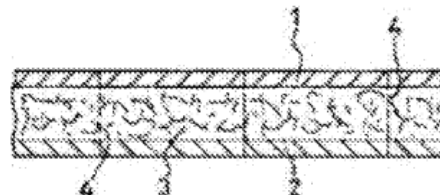
(72)Inventor : **MATSUMOTO TAKESHI**

(54) **WATERPROOF SHEET**

(57)Abstract:

PROBLEM TO BE SOLVED: To make urine and sweat absorbed and to prevent bedding, clothes and surrounding from being stained by using a water-permeable and water-diffusive texture for a surface fabric, using a water-impermeable and air-permeable texture by water-repellent finishing for a back fabric, and arranging an intermediate fabric having a water absorbing property and preventing the backflow of moisture between both fabrics.

SOLUTION: A knit fabric or a woven fabric made of a water-permeable and water-diffusive texture, preferably polyester or other synthetic fibers, and having a proper expansion/shrinkage property is used for a surface fabric 1 to be kept in direct contact with the skin. A knit fabric or a woven fabric made of a water-impermeable and air-permeable texture by water-repellent finishing, preferably polyester or other synthetic fibers, is used for a back fabric 2 to be kept in contact with the mattress of bedding. A nonwoven fabric or a knit fabric having a water absorbing property and having the required thickness to prevent the backflow of absorbed moisture is used for an intermediate fabric 3, and preferably a nonwoven fabric of synthetic fibers such as polyester and a warp-knit fabric such as raschel or tricot are used singularly or in lamination.



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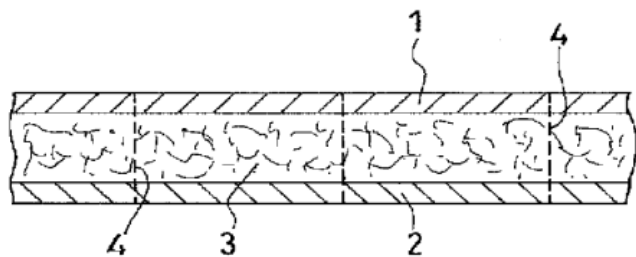
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(54)【発明の名称】 防水シート

(57)【要約】

【課題】 失禁や夜尿により漏れ出した尿や汗を吸収して、寝具、就寝中の人の着衣、周囲を汚すことなく、また、床ずれを起こしにくい防水シートを提供すること。

【解決手段】 表布1に透水性で、かつ水拡散性を有する布地を、裏布2に撥水加工を施すことにより不透水性で、かつ通気性を有する布地を、それぞれ用い、表布1と裏布2の間に、吸水性を有し、吸水した水分の逆流を防止する中布3を配する。



【特許請求の範囲】

【請求項1】 表布に透水性で、かつ水拡散性を有する布地を、裏布に撥水加工を施すことにより不透水性で、かつ通気性を有する布地を、それぞれ用い、表布と裏布の間に、吸水性を有し、吸水した水分の逆流を防止する中布を配したことを特徴とする防水シート。

【請求項2】 中布に不織布を用いたことを特徴とする請求項1記載の防水シート。

【請求項3】 中布にラッセル、トリコット等の経編布を用いたことを特徴とする請求項1記載の防水シート。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、防水シートに関し、特に、失禁のおそれのある老人、病人等や夜尿症の幼児が用いる寝具の敷布団やマットレス上に敷く防水シートに関するものである。

【0002】

【従来の技術】従来、失禁のおそれのある老人、病人等や夜尿症の幼児が用いる寝具の敷布団やマットレス上に、寝具を汚すことがないように、合成樹脂製シートや防水シートを敷くようにしている。このうち、防水シートは、布にゴム又は合成樹脂によるラミネート加工を施すことにより不透水性を備えるようにし、これによって、漏れ出した尿が、防水シートの下に敷いた寝具の敷布団やマットレスに染み込まないようにしている。

【0003】

【発明が解決しようとする課題】このように、防水シートは、同じ目的で使用される合成樹脂製シートと同様、不透水性を備えることによって、失禁や夜尿により漏れ出した尿が、防水シートの下に敷いた寝具の敷布団やマットレスに染み込まないようにし、寝具の汚れを防止することができるものであるが、その一方で、漏れ出した尿が、吸収されずに防水シート上に溜まって就寝中の人の着衣を濡らしたり、防水シートを伝って流れ出ることで周囲を汚すという問題があった。また、この種の合成樹脂製シートや防水シートは、不透水性を備えることだけを考えて製作させているため、通気性を備えておらず、このため、就寝中の人が汗をかいても吸収することができず、不快感を与えるだけでなく、健康上問題があり、特に、寝たきりの老人、病人等の場合には、床ずれを起こしやすくなるという問題があった。また、この種の合成樹脂製シートや防水シートは、通気性を備えていないため、床ずれを防止するために、近年広く用いられるようになってきている、加圧した空気を全面から噴出するようにした、いわゆる、エアーマットに使用した場合、本来のエアーマットの効果をなくしてしまうという問題があった。

【0004】本発明は、上記従来の失禁のおそれのある老人、病人等や夜尿症の幼児が用いる寝具の敷布団やマットレス上に敷く合成樹脂製シートや防水シートの有す

る問題点に鑑み、失禁や夜尿により漏れ出した尿や汗を吸収して、寝具、就寝中の人の着衣、周囲を汚すことがなく、また、床ずれを起こしにくい防水シートを提供することを目的とする。

【0005】

【課題を解決するための手段】上記目的を達成するため、本発明の防水シートは、表布に透水性で、かつ水拡散性を有する布地を、裏布に撥水加工を施すことにより不透水性で、かつ通気性を有する布地を、それぞれ用い、表布と裏布の間に、吸水性を有し、吸水した水分の逆流を防止する中布を配したことを特徴とする。

【0006】この防水シートは、直接肌が接する表布に、透水性で、かつ水拡散性を有する布地を用いるようにしているため、失禁や夜尿により漏れ出した尿や汗を、速やかに吸収して、吸水性を有し、吸水した水分の逆流を防止する中布に送り込み、中布に保持させることができ、寝具、就寝中の人の着衣、周囲を汚すことがない。また、中布に保持されている尿や汗が、防水シートの下に敷いた寝具の敷布団やマットレスに染み込まないようにする裏布に、撥水加工を施すことにより不透水性で、かつ通気性を有する布地を用いるようにしているため、汗等がこもらず、湿度を適度に保持することができる。

【0007】この場合において、中布には、不織布やラッセル、トリコット等の経編布を用いることができる。

【0008】これにより、表布と裏布の間に、失禁や夜尿により漏れ出した尿や汗を保持するための大きな空間を形成することができ、尿や汗を確実に保持することができるとともに、保持防水シート自体に、適度のクッション性を持たせることができる。

【0009】

【発明の実施の形態】以下、本発明の防水シートの実施の形態を図面に基づいて説明する。

【0010】図1～図2に、本発明の防水シートの一実施例を示す。この防水シートは、表布1に透水性で、かつ水拡散性を有する布地を、裏布2に撥水加工を施すことにより不透水性で、かつ通気性を有する布地を、それぞれ用い、表布1と裏布2の間に、吸水性を有し、吸水した水分の逆流を防止する中布3を配し、これらが分離しないように、縫着4して一体化するようにする。なお、この縫着方法は、本実施例に示すようなキルティング様のほか、三層の布1, 2, 3の外周縁を逢着する等、任意の逢着方法を採用することができる。

【0011】直接肌が接する表布1には、透水性で、かつ水拡散性を有する布地、好ましくは、ポリエステル、その他の合成繊維からなり、適度の伸縮性を有する編布又は織布を使用するようにする。ここでは、透水拡散加工、より具体的には、グラフト重合により親水基を導入したポリエステル改質加工したポリエステル繊維からなる編布を用いるようにしている。

【0012】防水シートの下に敷いた寝具の敷布団やマットレスに接する裏布2には、裏布に撥水加工を施すことにより不透水性で、かつ通気性を有する布地、好ましくは、ポリエステル、その他の合成繊維からなる編布又は織布を用いるようにしている。

【0013】表布1と裏布2の間に配する中布3には、吸水性を有し、吸水した水分の逆流を防止することができるように所要の厚みを有する不織布又は編布、好ましくは、ポリエステル等の合成繊維の不織布又はラッセル、トリコット等の経編布を単独で、あるいは、これらを積層して用いるようにしている。特に、ラッセル、トリコット等の経編布を用いた場合には、経編布のリブによって、表布1と中布3が密着することを防止することができ、これによって、中布3に吸水した水分が逆流することを確実に防止することができるものとなる。さらに、この中布3としてはスポンジの様な通気性、クッション性を有する合成樹脂製シート状のものを用いることもできる。

【0014】この防水シートは、従来の防水シートと同様、失禁のおそれのある老人、病人等や夜尿症の幼児が用いる寝具の敷布団やマットレス上に敷いて用いるものであるが、直接肌が接する表布1に、透水性で、かつ水拡散性を有する布地を用いるようにしているため、失禁や夜尿により漏れ出した尿や汗を、速やかに吸収して、その下に配した、吸水性を有し、吸水した水分に逆流を防止する中布2に送り込み、この中布2に保持させることができ、従来の防水シートのように漏れ出した尿が吸収されずに防水シート上に溜まるようなことがなく、これによって、寝具、就寝中の人の着衣、周囲を汚すことがなく、長時間に亘って、快適な状態を維持することができるものとなる。また、中布2に保持されている尿や汗が、防水シートの下に敷いた寝具の敷布団やマットレスに染み込まないようにする裏布2は、撥水加工を施すことにより不透水性で、かつ通気性を有する布地を用いるようにしているため、汗等がこもらず、湿度を適度に

保持することができ、床ずれを防止することができるものとなる。さらに、近年広く用いられるようになってきている、加圧した空気を全面から噴出するようにしたエアーマットを併用することができ、床ずれを有効に防止することができる。

【0015】

【発明の効果】本発明の防水シートによれば、直接肌が接する表布に、透水性で、かつ水拡散性を有する布地を用いるようにしているため、失禁や夜尿により漏れ出した尿や汗を、速やかに吸収して、吸水性を有し、吸水した水分に逆流を防止する中布に送り込み、中布に保持させることができ、寝具、就寝中の人の着衣、周囲を汚すことがなく、長時間に亘って、快適な状態を維持することができる。また、中布に保持されている尿や汗が、防水シートの下に敷いた寝具の敷布団やマットレスに染み込まないようにする裏布に、撥水加工を施すことにより不透水性で、かつ通気性を有する布地を用いるようにしているため、汗等がこもらず、湿度を適度に保持することができ、床ずれを防止することができ、さらに、床ずれを有効に防止することができるエアーマットを併用することも可能となる。

【0016】また、中布に、不織布やラッセル、トリコット等の経編布を用いることにより、表布と裏布の間に、失禁や夜尿により漏れ出した尿や汗を保持するための大きな空間を形成することができ、尿や汗を確実に保持することができるとともに、保持防水シート自体に、適度のクッション性を持たせることができる。

【図面の簡単な説明】

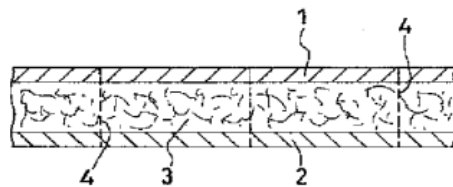
【図1】本発明の防水シートの平面図である。

【図2】同断面図である。

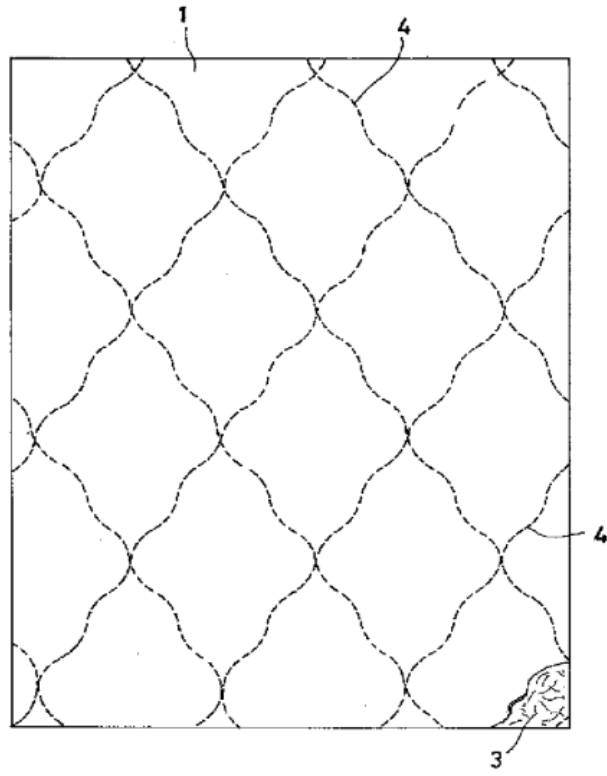
【符号の説明】

- 1 表布
- 2 裏布
- 3 中布

【図2】



【图 1】



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) 29 APRIL 2010 (29.04.2010)

Applicant's or agent's file reference SHEEX1PCT	FOR FURTHER ACTION See paragraph 2 below
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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)
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International Patent Classification (IPC) or both national classification and IPC <i>D04B 21/14(2006.01)i, D03D 11/00(2006.01)i</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	
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**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 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	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.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

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

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.

A. CLASSIFICATION OF SUBJECT MATTER**D04B 21/14(2006.01)i, D03D 11/00(2006.01)i**

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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)**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier 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

29 APRIL 2010 (29.04.2010)

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

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) 29 APRIL 2010 (29.04.2010)
FOR FURTHER ACTION See paragraph 2 below

Applicant's or agent's file reference SHEEX1PCT	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)
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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	
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**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 Patent Application Fee Transmittal

Application Number:	13272977			
Filing Date:	13-Oct-2011			
Title of Invention:	Fabric System			
First Named Inventor/Applicant Name:	Susan Walvius			
Filer:	Frank L. Gerratana/jennifer franco			
Attorney Docket Number:	29712-0002003			
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
Total in USD (\$)				180

Electronic Acknowledgement Receipt

EFS ID:	12094218
Application Number:	13272977
International Application Number:	
Confirmation Number:	4915
Title of Invention:	Fabric System
First Named Inventor/Applicant Name:	Susan Walvius
Customer Number:	26161
Filer:	Frank L. Gerratana/jennifer franco
Filer Authorized By:	Frank L. Gerratana
Attorney Docket Number:	29712-0002003
Receipt Date:	16-FEB-2012
Filing Date:	13-OCT-2011
Time Stamp:	15:18:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$180
RAM confirmation Number	1941
Deposit Account	061050
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
		000752			

1		2003IDS.pdf	141627 c5dfec0cce4f1cc453804df76e7142251bffa b85	yes	4
Multipart Description/PDF files in .zip description					
		Document Description	Start	End	
		Transmittal Letter	1	2	
		Information Disclosure Statement (IDS) Form (SB08)	3	4	
Warnings:					
Information:					
2	Foreign Reference	CN102245822.pdf	1436722 67a5370f8b011bcc308110a1d6eda7df95c4 2903	no	13
Warnings:					
Information:					
3	Foreign Reference	JP1999309183.pdf	328798 6bc854ce17ad8923b19697b6935b82128c0 8ef54	no	5
Warnings:					
Information:					
4	Non Patent Literature	2CA1_OA_1_16_12.pdf	400421 1efb5f366c5b70630b29dc260f51ae0c7aea 5ad2	no	4
Warnings:					
Information:					
5	Non Patent Literature	2EP1_Comm_5_27_11.pdf	117168 8df182cf227b87d1a5378cc75440755da164 e699	no	2
Warnings:					
Information:					
6	Non Patent Literature	2EP1_RCOMM_11_22_11.pdf	249260 611bfd45983aab144b0e79f08473df5df64fc 43fb	no	12
Warnings:					
Information:					
7	Non Patent Literature	2001_pendingclaims_659.pdf	52210 68300112732efe65db587e700158691751d 800a	no	6
Warnings:					
Information:					
8	Non Patent Literature	2002_pendingclaims_884.pdf 000753	46899 1b27449d83fa50f6ab1779f780a047cd4422 728b	no	5

Warnings:					
Information:					
9	Non Patent Literature	0002001TH_659.pdf	79770 b1ea73e5ca2dcf8e0e0dbe9cd619e3372c bd537	no	2
Warnings:					
Information:					
10	Non Patent Literature	2002TH_884.pdf	76719 78ed102d60d1e1660725e9353785063bc9 e865d	no	1
Warnings:					
Information:					
11	Non Patent Literature	2WO1_IPRP.pdf	182518 bd6c05007e497bd2f7f0d0f8bcc3a983352a 2aeb	no	4
Warnings:					
Information:					
12	Non Patent Literature	2WO1_ISR.pdf	120408 2a775122b9388b2a4125a59215c27a977de eb83f	no	3
Warnings:					
Information:					
13	Non Patent Literature	2WO1_WO.pdf	176341 32575fc6901986de41663f446b4dccc016b2 722d2	no	4
Warnings:					
Information:					
14	Non Patent Literature	2EP1_COMM_2_16_12.pdf	97993 b664ad2d46de1eda456340c45d4d7be374 22d783	no	3
Warnings:					
Information:					
15	Fee Worksheet (SB06)	fee-info.pdf	29686 b91a12069fb43ab89931411b781e6b3642e 430c0	no	2
Warnings:					
Information:					
Total Files Size (in bytes):				3536540	

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.	Art Unit	: 3673
Serial No.	: 13/272,977	Examiner	: Nicholas F. Polito
Filed	: October 13, 2011	Conf. No.	: 4915
Title	: FABRIC SYSTEM		

MAIL STOP AMENDMENT

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

INFORMATION DISCLOSURE STATEMENT

Please consider the references listed on the attached PTO-1449 form.

Copies of United States patent documents will be provided upon request. Copies of all non-U.S. patent documents and other documents are enclosed.

The United States patent applications and/or patents listed below contain material related to material in this application. Copies of the applications and/or patents, their current claims (in the case of patents), and their transaction histories from the patent office public PAIR website are enclosed (or were provided previously with information disclosure statements identified in the table).

The applicant invites the examiner to consider the claims and claim amendments of these other applications and/or patents, and the positions of the examiners and the applicant that appear in their prosecution histories. The applicant understands that the examiner has direct access to these papers at the patent office, but will be happy to provide copies to the examiner upon request.

Applicant : Susan Walvius et al.
Serial No. : 13/272,977
Filed : October 13, 2011
Page : 2 of 2

Attorney's Docket No.: 29712-0002003

US serial number and filing date/ status	Examiner and group art unit	Is patent or application attached and listed on form 1449 and/or what is the date of a prior information disclosure statement with which it was submitted	In the case of an application, are claims attached or what is the date of a prior information disclosure statement with which they were submitted	Is current PAIR transaction history attached and listed on form 1449
61/101,049 09/29/2008 Expired	N/A	No	No	No
12/569,659 09/29/2009 Pending	Nicholas F. Polito GAU 3673	Yes - publication 2011/0000020 submitted	Yes	Yes
13/271,884 10/12/2011 Pending	Nicholas F. Polito GAU 3673	Yes - publication 2012/0024013 submitted	Yes	Yes

This statement is being filed after a first Office action on the merits, but before receipt of a final Office action or a Notice of Allowance. The fees in the amount of \$180 in payment of the late submission fee of §1.17(p) are being paid concurrently herewith. In addition, please apply any other necessary charges or credits to deposit account 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: February 16, 2012 _____

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22792695.doc

000757



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

Table with 4 columns: APPLICATION NUMBER (13/272,977), FILING OR 371(C) DATE (10/13/2011), FIRST NAMED APPLICANT (Susan Walvius), ATTY. DOCKET NO./TITLE (29712-0002003)

CONFIRMATION NO. 4915

PUBLICATION NOTICE

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



Title: Fabric System

Publication No. US-2012-0030874-A1
Publication Date: 02/09/2012

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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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	01/06/2012	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
			01/06/2012	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

Application No. 13/272,977	Applicant(s) WALVIUS ET AL.	
Examiner NICHOLAS POLITO	Art Unit 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 3 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 30 November 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) 38-40 is/are withdrawn from consideration.
- 6) Claim(s) _____ is/are allowed.
- 7) Claim(s) 14-36 and 41 is/are rejected.
- 8) Claim(s) 37 is/are objected to.
- 9) Claim(s) _____ 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 13 October 2011 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: _____.

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DETAILED ACTION

Election/Restrictions

1. Claims 38-40 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 11/30/2011.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to

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be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 14-25, 28-37 and 41 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-4 and 28 of copending Application No. 12/569,659 and claims 25-43 of copending Application No. 13/271,884. Although the conflicting claims are not identical, they are not patentably distinct from each other because they are drawn to the same subject matter but written separately as method and apparatus claims.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 14, 15, 17-19, 21-24, 28, 30-33 and 35 are rejected under 35 U.S.C. 102(b) as being anticipated by Murphy et al. (U.S. Patent No. 6,823,548).

6. Regarding claim 14, Murphy et al. teach in Figures 1-3 and column 5, lines 46 to 67 a bed sheet comprising a fabric of a man-made fiber, the fabric having higher

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breathability, higher heat transfer, and higher moisture wicking characteristics than a cotton fabric.

7. Regarding claim 15, Murphy et al. teach in Figures 1-3 the bed sheet of claim 14 wherein the fabric comprises a finished fabric comprising: a first circular knitted (Table 1, Ex. No. 1.3) fabric portion (22); and a second circular knitted fabric portion (24); at least one of the fabric portions comprising a performance fabric portion (col. 5, lines 46-67); the first and second fabric portions being discrete and joined to form the finished fabric (col. 6, lines 41-48).

8. Regarding claim 17, Murphy et al. teach in column 5, lines 20 to 29 the bed sheet of claim 15, wherein the first and second fabric portions have different fabric characteristics.

9. Regarding claim 18, Murphy et al. teach in column 5, lines 46 to 67 the bed sheet of claim 17, wherein at least one of the fabric characteristics comprises moisture management.

10. Regarding claim 19, Murphy et al. teach in column 5, lines 46 to 67 the bed sheet of claim 14 in which the fabric is knit of the man-made fiber.

11. Regarding claim 21, Murphy et al. teach in Table 1, Ex. No. 1.3 the bed sheet of claim 14 in which the fabric is circularly knit.

12. Regarding claim 22, Murphy et al. teach in column 3, lines 43 to 61, column 5, lines 46 to 64 and Table 1, Ex. No. 1.3 the bed sheet of claim 14 being stretchable to fit either a baby crib and an adult bed.

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13. Regarding claim 23, Murphy et al. teach in column 3, lines 43 to 61, column 5, lines 46 to 64 and Table 1, Ex. No. 1.3 the bed sheet of claim 14 that is sufficiently stretchable to fit a standard rectangular bed and a smaller, non-rectangular marine bed.

14. Regarding claim 24, Murphy et al. teach in column 3, lines 43 to 61, column 5, lines 46 to 64 and Table 1, Ex. No. 1.3 the bed sheet of claim 14 that is sufficiently stretchable to fit either a crib or a standard adult bed.

15. Regarding claim 28, Murphy et al. teach in column 5, lines 46 to 67 the bed sheet of claim 17, wherein at least one of the fabric characteristics is UV protection.

16. Regarding claim 30, Murphy et al. teach in column 5, lines 46 to 67 the bed sheet of claim 17, wherein at least one of the fabric characteristics is thermo-regulation.

17. Regarding claim 31, Murphy et al. teach in column 5, lines 46 to 67 the bed sheet of claim 17, wherein at least one of the fabric characteristics is wind resistance.

18. Regarding claim 32, Murphy et al. teach in column 5, lines 46 to 67 the bed sheet of claim 17, wherein at least one of the fabric characteristics is water resistance.

19. Regarding claim 33, Murphy et al. teach in column 5, lines 46 to 67 a bed sheet comprising a circularly knit fabric including a high performance man-made fiber.

20. Regarding claim 35, Murphy et al. teach in Table 1, Ex. No. 1.3 the bed sheet of claim 33 in which the bed sheet comprises at least two portions of the circularly knit fabric.

Claim Rejections - 35 USC § 103

21. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

22. Claims 16, 20, 25, 26, 34 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murphy et al.

23. Regarding claim 16, Murphy et al. teach the bed sheet of claim 14. Murphy et al. do not teach piping. The examiner takes official notice that it is commonly known in the art to provide piping to a fabric. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to provide piping to the bed fabric of Murphy et al. to provide a finished edge

24. Regarding claim 20, Murphy et al. teach the bed sheet of claim 14. Murphy et al. do not teach wherein the fabric has a gauge of at least 17 gauges. The examiner takes official notice that it is commonly known in the art to use high gauge fabrics for bed coverings. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a gauge of at least 17, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

25. Regarding claim 25, Murphy et al. teach the bed sheet of claim 14. Murphy et al. do not teach wherein the bed sheet is at least 90 inches wide. Murphy et al. do not teach wherein the finished fabric is at least 90 inches wide. Murphy et al. teach column 3, lines 42 to 45 wherein the finished fabric is for a mattress. The examiner takes official notice that it is commonly known in the art for a standard size mattress cover to be at least 90 inches wide. Therefore, it would have been obvious to a person having ordinary

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skill in the art at the time the invention was made to make the finished fabric of Murphy et al. at least 90 inches wide to cover a standard mattress.

26. Regarding claim 26, Murphy et al. teach the bed sheet of claim 14. Murphy et al. do not teach wherein the bed sheet has dimensions of approximately 102 inches in length and approximately 91 inches in width. Murphy et al. teach column 3, lines 42 to 45 wherein the finished fabric is for a mattress. The examiner takes official notice that it is commonly known in the art for a standard size mattress cover to have dimensions of approximately 102 inches in length and approximately 91 inches in width. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to make the finished fabric of Murphy et al. 102 inches in length and approximately 91 inches in width to cover a standard mattress.

27. Regarding claim 34, Murphy et al. teach the bed sheet of claim 33. Murphy et al. do not teach wherein the bed sheet is at least 90 inches wide. Murphy et al. do not teach wherein the finished fabric is at least 90 inches wide. Murphy et al. teach column 3, lines 42 to 45 wherein the finished fabric is for a mattress. The examiner takes official notice that it is commonly known in the art for a standard size mattress cover to be at least 90 inches wide. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to make the finished fabric of Murphy et al. at least 90 inches wide to cover a standard mattress.

28. Regarding claim 41, Murphy et al. teach in Figures 1-3 a bed sheet comprising a fabric circularly knit (Table 1, Ex. No. 1.3) of a man-made fiber (col. 5, lines 46-67), the

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fabric having a gauge of at least 17 gauges, and the fabric having higher breathability, higher heat transfer, and higher moisture wicking characteristics than a cotton fabric.

29. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murphy et al. in view of Ford (U.S. Patent No. 2,804,632).

30. Regarding claim 27, Murphy et al. teach the bed sheet of claim 14. Murphy et al. do not teach a pull tie that can be cinched to increase tension around an edge of the bed sheet. Ford teaches in Figures 1-3 a bed sheet comprising a pull tie (44, 47) that can be cinched to increase tension around an edge of the bed sheet. In view of Ford, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine the pull tie of Ford with the bed sheet of Murphy et al. to fit a cover to a mattress.

31. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murphy et al. in view of Porter et al. (U.S. Patent No. 4,690,859).

32. Regarding claim 29, Murphy et al. teach the finished fabric of claim 17. Murphy et al. do not teach wherein at least one of the fabric characteristics comprises anti-microbial properties. Porter et al. teach in column 4, lines 4 to 14 a finished fabric comprising anti-microbial properties. In view of Porter et al., it would have been obvious to a person having ordinary skill in the art at the time the invention was made to combine the anti-microbial properties of Porter et al. with the finished fabric of Murphy et al. to prevent the growth of microorganisms.

33. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murphy et al. in view of Link et al. (U.S. Pub. No. 2007/0283493).

Art Unit: 3673

34. Regarding claim 36, Murphy et al. teach the finished fabric of claim 33. Murphy et al. do not teach a knit fabric that includes polyurethanepolyurea copolymer fiber. Link et al. teach in paragraph 28 a knit fabric that includes polyurethanepolyurea copolymer fiber. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use polyurethanepolyurea copolymer fiber, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416. See also *Ballas Liquidating Co. v. Allied industries of Kansas, Inc.* (DC Kans) 205 USPQ 331.

Allowable Subject Matter

35. Claim 37 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

36. The following is a statement of reasons for the indication of allowable subject matter: Murphy et al. and Link et al., taken either alone or in combination, do not teach “polyurethanepolyurea copolymer fiber is included in the knit fabric in a proportion that, if circularly knit at a high gauge, the knit fabric could be knit at no more than a 72.5 inch circumference without losing integrity of the polyurethanepolyurea copolymer fiber.”

Conclusion

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.

Art Unit: 3673

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.

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

12/21/2011

Notice of References Cited	Application/Control No. 13/272,977	Applicant(s)/Patent Under Reexamination WALVIUS ET AL.	
	Examiner NICHOLAS POLITO	Art Unit 3673	Page 1 of 1

U.S. PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A US-6,823,548	11-2004	Murphy et al.	5/698
*	B US-2,804,632	09-1957	ALEXANDER FORD JESSE	5/496
*	C US-4,690,859	09-1987	Porter et al.	442/68
*	D US-2007/0283493	12-2007	Link et al.	5/483
	E US-			
	F US-			
	G US-			
	H US-			
	I US-			
	J US-			
	K US-			
	L US-			
	M US-			

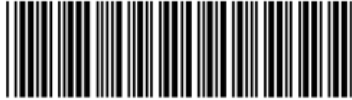
FOREIGN PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N				
	O				
	P				
	Q				
	R				
	S				
	T				

NON-PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)				
	U				
	V				
	W				
	X				

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

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

CLAIM		DATE							
Final	Original	11/09/2011	12/21/2011						
	1	-	-						
	2	-	-						
	3	-	-						
	4	-	-						
	5	-	-						
	6	-	-						
	7	-	-						
	8	-	-						
	9	-	-						
	10	-	-						
	11	-	-						
	12	-	-						
	13	-	-						
	14	÷	✓						
	15	÷	✓						
	16	÷	✓						
	17	÷	✓						
	18	÷	✓						
	19	÷	✓						
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	27	÷	✓						
	28	÷	✓						
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	30	÷	✓						
	31	÷	✓						
	32	÷	✓						
	33	÷	✓						
	34	÷	✓						
	35	÷	✓						
	36	÷	✓						

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

✓	Rejected
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A	Appeal
O	Objected

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

CLAIM		DATE							
Final	Original	11/09/2011	12/21/2011						
	37	÷	O						
	38	÷	N						
	39	÷	N						
	40	÷	N						
	41	÷	✓						

Substitute Form PTO-1449 (Modified) Information Disclosure Statement by Applicant (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. 13/272,977
	Applicant Susan Walvius et al.		
	Filing Date October 13, 2011	Group Art Unit 3673	

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	1	5,765,241	1998-06-16	Macdonald			
	2	5,817,391	1998-10-06	Rock et al.			
	3	6,381,779	2002-05-07	Thompson			

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	JP 11309183	1999-11-09	Japan				
	5	EP2344691	07/20/2011	Europe				
	6	WO2010/037082	04/01/10	WIPO				
	7	ES2368481	11/17/2011	Spain				

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

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

Examiner Signature /Nicholas Polito/	Date Considered 12/21/2011
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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.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L11	0	(11/759586).APP.	USPAT; USOCR	OR	OFF	2011/12/21 20:35
L12	41	5/482-502.ccls. and (antimicrobial or anti-microbial)	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/21 20:40
L13	3	5/482-502.ccls. and (pull-tie or (pull adj tie))	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/21 21:33
L14	378	5/482-502.ccls. and tie	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/21 21:34
L15	107	5/482-484,486,499-502.ccls. and tie	US-PGPUB; USPAT; USOCR	OR	OFF	2011/12/21 21:34
L17	39	5/496,497.ccls. and tie	US-PGPUB; USPAT; USOCR	OR	OFF	2011/12/21 21:36
L18	711	5/496,497.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/12/21 21:45
S1	1	12/569659 or 13/271884 or 13/272977	US-PGPUB; USPAT; USOCR	OR	OFF	2011/12/19 16:46
S2	23	"5"/.clas. and ((circle or circular) adj knit)	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/19 16:49
S3	118	((circle or circular) adj knit) and stitch and (heat adj set)	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/19 16:52
S4	18	((circle or circular) adj knit) same stitch same (heat adj set)	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/19 16:52
S5	3	"5"/.clas. and (((circle or circular) adj knit) and stitch and (heat adj set))	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/19 16:57
S6	27828	bedding or (bed near sheet) or (mattress near cover\$3)	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/20 14:21
S7	1867	((circle or circular) adj knit)	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/20 14:21
S8	109	S6 and S7	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/20 14:21
S9	24359	(heat-set\$4) or (heat adj set\$4)	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/20 14:23

000774

S10	11	S6 and S7 and S9	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/20 14:24
S11	23	flatlock near stitch\$3	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/20 14:27
S12	0	(12/162516).APP.	USPAT; USOCR	OR	OFF	2011/12/20 15:29
S13	0	("2009/0044338").URPN.	USPAT	OR	OFF	2011/12/20 15:29
S14	0	(10/710179).APP.	USPAT; USOCR	OR	OFF	2011/12/20 15:32
S15	1	("2005/0284189").URPN.	USPAT	OR	OFF	2011/12/20 15:33
S16	20	("4504991" "4801493" "5279878" "5645926" "5935882" "5972512").PN. OR ("6823548").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/12/20 15:44
S17	10	5/482-502.ccls. and ((circle or circular) adj knit)	US-PGPUB; USPAT; USOCR	OR	OFF	2011/12/20 15:45
S18	12	5/482-502.ccls. and ((circle or circular or round) near knit\$3)	US-PGPUB; USPAT; USOCR	OR	OFF	2011/12/20 15:46
S19	8356	((circle or circular or round) adj knit\$4)	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/20 15:59
S20	8586	((circle or circular or round) near knit\$4)	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/20 15:59
S21	165	S6 and S20	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/20 15:59
S22	9978	((circle or circular or round or jersey or fleece or terry or double) adj knit\$4)	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/20 16:12
S23	28	5/482-502.ccls. and ((circle or circular or round or jersey or fleece or terry or double) adj knit\$4)	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/20 16:12
S24	281	5/482-502.ccls. and knit\$4	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/20 16:22
S25	3	((("5765241") or ("5817391") or ("6381779"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/12/20 18:07
S26	2028	5/482-484,486,499-502.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/12/20 18:09
S27	1	((susan near walvius) or (michelle near marciniak)).in.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/12/20 18:27
S28	55	5/482-502.ccls. and spandex	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/21 17:24
S29	47	spandex with antimicrobial	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/21 17:34

S30	0	spandex with circumference with gauge	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/21 17:38
S31	4	spandex same circumference same gauge	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/21 17:38

12/ 21/ 2011 9:48:49 PM

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BIB DATA SHEET

CONFIRMATION NO. 4915

SERIAL NUMBER 13/272,977	FILING or 371(c) DATE 10/13/2011 RULE	CLASS 005	GROUP ART UNIT 3673	ATTORNEY DOCKET NO. 29712-0002003	
APPLICANTS Susan Walvius, Chapin, SC; Michelle Marciniak, Irmo, SC; ** CONTINUING DATA ***** This application is a CON of 12/569,659 09/29/2009 which claims benefit of 61/101,049 09/29/2008 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 10/27/2011					
Foreign Priority claimed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No 35 USC 119(a-d) conditions met <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Verified and /NICHOLAS F POLITO/ Acknowledged Examiner's Signature	<input type="checkbox"/> Met after Allowance Initials	STATE OR COUNTRY SC	SHEETS DRAWINGS 4	TOTAL CLAIMS 28	INDEPENDENT CLAIMS 4
ADDRESS FISH & RICHARDSON P.C. (BO) P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022 UNITED STATES					
TITLE Fabric System					
FILING FEE RECEIVED 2280	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit		

Substitute Form PTO-1449 (Modified) Information Disclosure Statement by Applicant (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 /Nicholas Polito/	Date Considered 12/21/2011
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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.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /N.P./

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Susan Walvius et al. Art Unit : Unknown
Serial No. : Unknown Examiner : Unknown
Filed : Unknown Conf. No. : Unknown
Title : FABRIC SYSTEM

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 with the application. Please apply any necessary charges or credits to Deposit Account 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: October 13, 2011 _____


/Frank L. Gerratana/ _____
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22720718.doc

/Nicholas Polito/

12/21/2011

Search Notes 	Application/Control No. 13272977	Applicant(s)/Patent Under Reexamination WALVIUS ET AL.
	Examiner NICHOLAS POLITO	Art Unit 3673

SEARCHED			
Class	Subclass	Date	Examiner
5	482 - 484, 486, 496, 497, 499 - 502	12/21/2011	NP

SEARCH NOTES		
Search Notes	Date	Examiner
EAST Search History Attached	12/21/2011	NP

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

/NICHOLAS POLITO/ Examiner.Art Unit 3673	
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Substitute Form PTO-1449 (Modified) Information Disclosure Statement by Applicant (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. 13/272,977
	Applicant Susan Walvius et al.		
	Filing Date October 13, 2011		Group Art Unit 3673

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	1	5,765,241	1998-06-16	Macdonald			
	2	5,817,391	1998-10-06	Rock et al.			
	3	6,381,779	2002-05-07	Thompson			

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	4	JP 11309183	1999-11-09	Japan				
	5	EP2344691	07/20/2011	Europe				
	6	WO2010/037082	04/01/10	WIPO				
	7	ES2368481	11/17/2011	Spain				

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

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.	



PATENT ABSTRACTS OF JAPAN

(11) Publication number: **11309183 A**(43) Date of publication of application: **09.11.99**

(51) Int. Cl.
A61G 7/05
A47G 9/02
B32B 5/26
D06M 17/00

(21) Application number: **10132738**(71) Applicant: **MORIUCHI KYU KK**(22) Date of filing: **27.04.98**(72) Inventor: **MATSUMOTO TAKESHI**(54) **WATERPROOF SHEET**

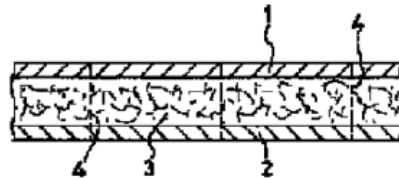
of synthetic fibers such as polyester and a warp-knit fabric such as raschel or tricot are used singularly or in lamination.

(57) Abstract:

PROBLEM TO BE SOLVED: To make urine and sweat absorbed and to prevent bedding, clothes and surrounding from being stained by using a water-permeable and water-diffusive texture for a surface fabric, using a water-impermeable and air-permeable texture by water-repellent finishing for a back fabric, and arranging an intermediate fabric having a water absorbing property and preventing the backflow of moisture between both fabrics.

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SOLUTION: A knit fabric or a woven fabric made of a water-permeable and water-diffusive texture, preferably polyester or other synthetic fibers, and having a proper expansion/shrinkage property is used for a surface fabric 1 to be kept in direct contact with the skin. A knit fabric or a woven fabric made of a water-impermeable and air-permeable texture by water-repellent finishing, preferably polyester or other synthetic fibers, is used for a back fabric 2 to be kept in contact with the mattress of bedding. A nonwoven fabric or a knit fabric having a water absorbing property and having the required thickness to prevent the backflow of absorbed moisture is used for an intermediate fabric 3, and preferably a nonwoven fabric



EP 2344691

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

(19) World Intellectual Property Organization
International Bureau



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1 April 2010 (01.04.2010)

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(10) International Publication Number
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- (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
- (71) Applicant (for all designated States except US): SHEEP
LLC [US/US]; 169 Captain Lowman Road, Chapin, SC
29036 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): WALVIUS, Susan,
Katherine [US/US]; 169 Captain Lowman Road, Chapin,
SC 29036 (US). MARCINIAK, Michelle, Marie
[US/US]; 169 Captain Lowman Road, Chapin, SC 29036
(US).
- (74) Agent: SCHNEIDER, Ryan, A.; Troutman Sanders
LLP, Bank of America Plaza, 600 Peachtree Street, N.E.,
Suite 5200, Atlanta, GA 30308-2216 (US).

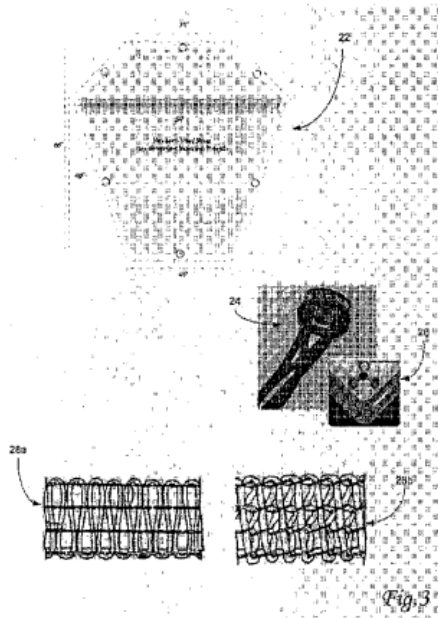
- (81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ,
CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO,
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(57) Abstract: Bedding material 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.

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

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 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 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 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.

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.

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**.

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 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 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 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 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.

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.

“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 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.

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 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
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.
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 finished fabric at least 90 inches wide comprising:
circular knitting at least two discrete performance fabric portions; and
stitching at least two discrete performance fabric portions together to form the finished fabric.
6. The method according to Claim 5, wherein the finished fabric comprises a bed sheet.
7. The method according to Claim 5, further comprising heat setting finishing the finished fabric.
8. The method according to Claim 5, further comprising providing piping to the finished fabric.
9. A method of making a bed sheet at least 90 inches wide from performance fabric comprising:
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.

10. The method according to Claim 9, further comprising providing piping to the finished bed sheet.

11. The method according to Claim 9, wherein the at least two discrete performance fabric portions have different fabric characteristics.

12. The method according to Claim 11, wherein fabric characteristics are selected from the group consisting of moisture management, UV protection, anti-microbial, thermo-regulation, wind resistance and water resistance.

13. 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.

14. The finished fabric of Claim 13, wherein the finished fabric comprises a bed sheet.

15. The finished fabric of Claim 13, further comprising piping.

16. The finished fabric of Claim 13, wherein the first and second performance fabrics have different fabric characteristics.

17. The finished fabric of Claim 16, wherein fabric characteristics are selected from the group consisting of moisture management, UV protection, anti-microbial, thermo-regulation, wind resistance and water resistance.

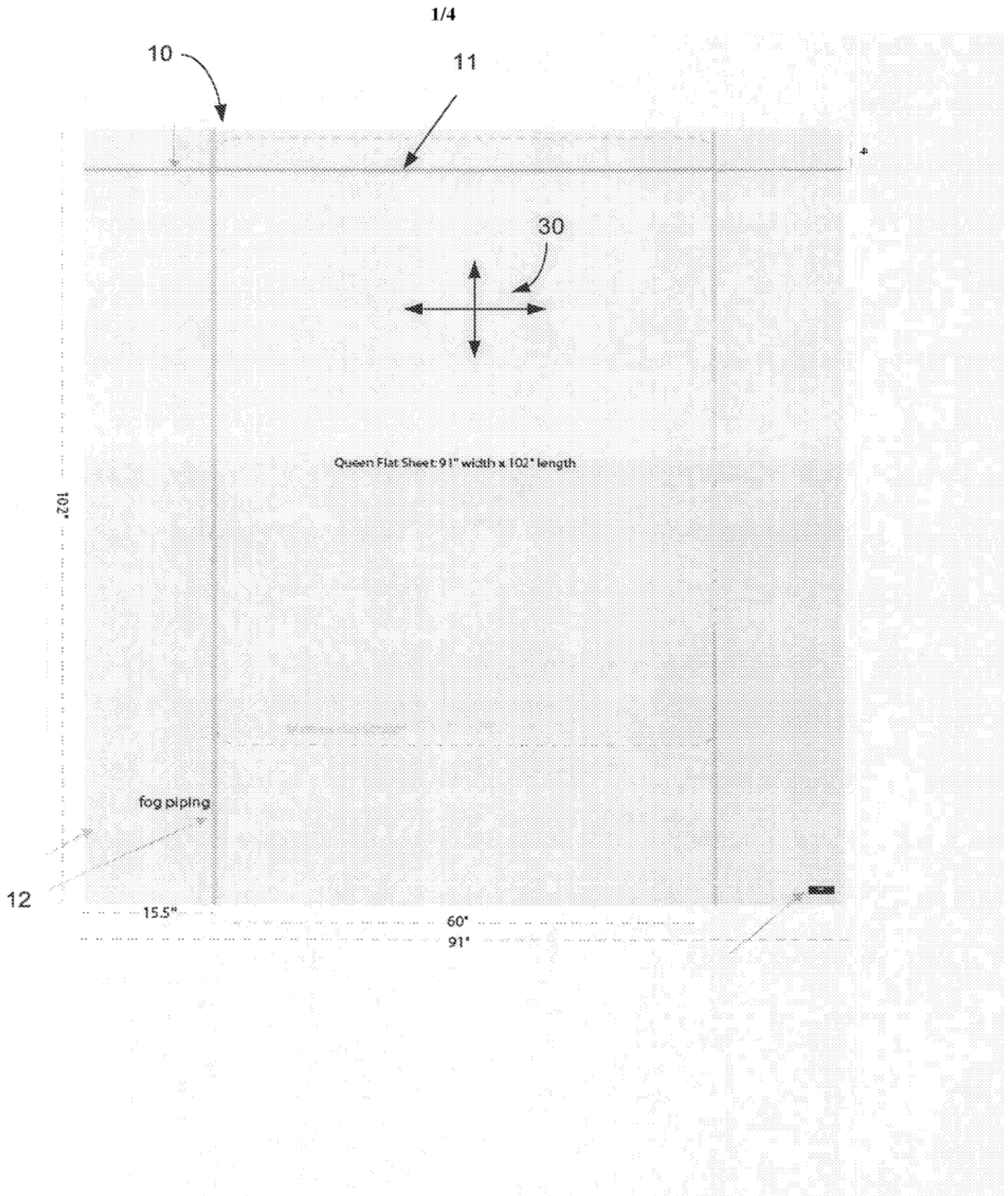


Fig. 1

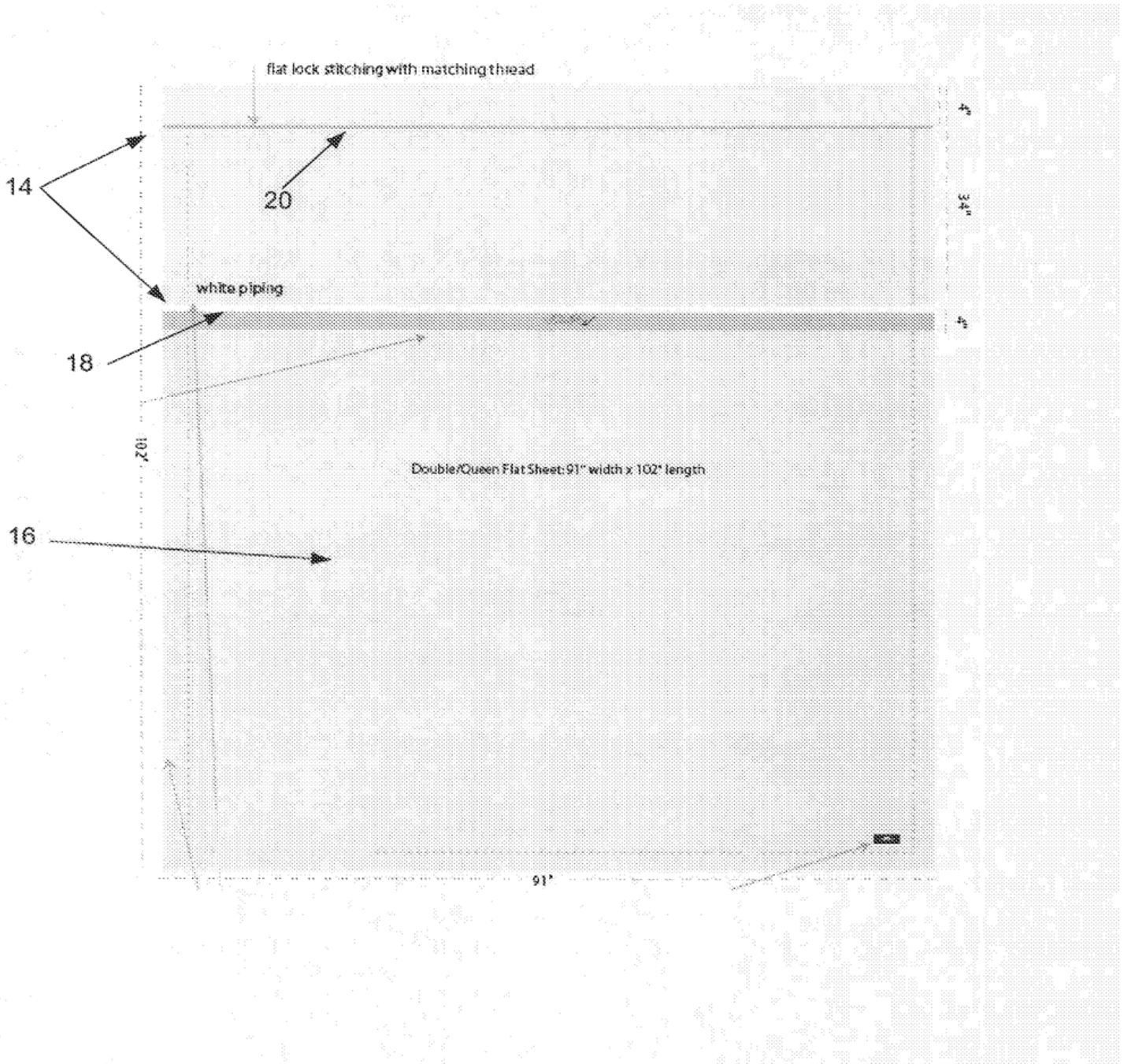


Fig. 2

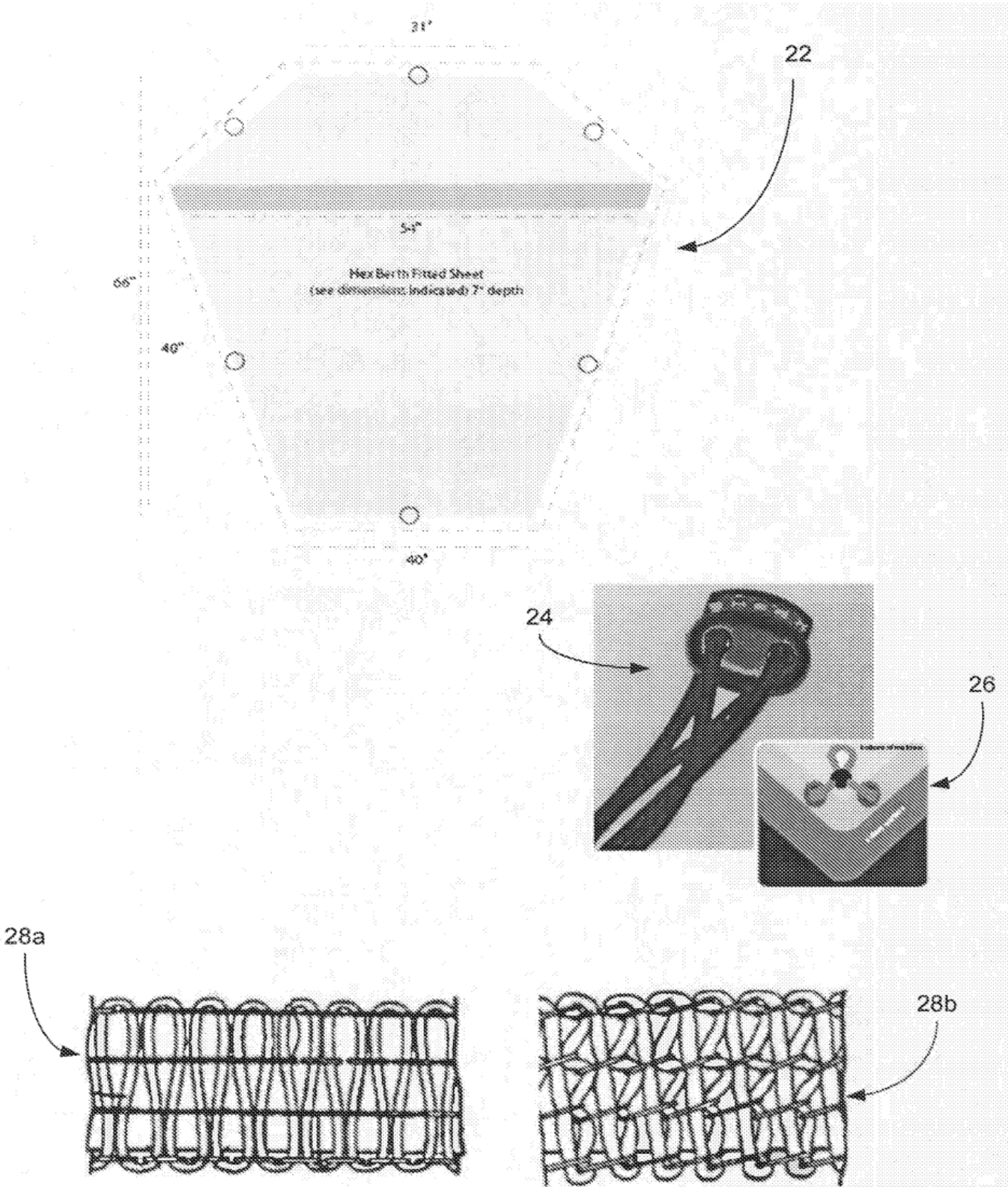


Fig. 3