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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/980,449	03/01/2022	11261566	VP-22858	1867

24131 7590 02/09/2022

LERNER GREENBERG STEMER LLP
P O BOX 2480
HOLLYWOOD, FL 33022-2480

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

INVENTOR(s) (Please see PAIR WEB site http://pair.uspto.gov for additional inventors):

ROBERT EBERHARDT, ELLWANGEN, GERMANY;
SUSANNE KLASCHKA, KOELN, GERMANY;

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

VOITH PATENT GMBH, HEIDENHEIM, GERMANY;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

IR103 (Rev. 10/09)

and the diameter (MDYD) of the associated MD threads has a ratio LD/MDYD between 2.5 and 4, in particular between 2.7 and 3.6.

Change(s) applied to document, /A.C./ 11/2/2021

Page ~~14, between lines 27 and 28,~~ 15, before line 1 insert:

-- BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING --.

Page 15, between lines ~~7 and 8~~ 13 and 14, insert:

-- DETAILED DESCRIPTION OF THE INVENTION --.

Page 17, lines ~~14-18~~ 19-23, replace the paragraph with the following amended paragraph:

The diameter of the circle in the case of figure 4 is 1200 µm. The diameter of the MD thread is around 340 µm. The resultant LD/MDYD ratio is therefore 1200/340 = 3.5. A clothing having such seam loops thus fulfills the feature ~~of the characterizing part of claim 1~~ in which the diameter LD of the seam loops 41, 42 and the diameter MDYD of the associated MD threads 10 has a ratio LD/MDYD between 2.5 and 4, in particular between 2.7 and 3.6.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

24181 7590 01/27/2022
LERNER GREENBERG STEMER LLP
P O BOX 2480
HOLLYWOOD, FL 33022-2480

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/580,449	09/14/2020	ROBERT EBERHARDT	VP-22858	1867

TITLE OF INVENTION: CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	01/27/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
ESLAMI, MATTHEW M	1748	162-348000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Laurence A. Greenberg
2 Werner H. Stemer
3 Ralph E. Locher

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: Voith Patent GmbH

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Heidenheim, Germany

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

☒ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 12-1099

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date: January 25, 2022

Typed or printed name: RALPH E. LOCHER
REG. NO. 41,947

Registration No. RALPH E. LOCHER
REG. NO. 41,947

Electronic Patent Application Fee Transmittal

Application Number:	16980449
Filing Date:	14-Sep-2020
Title of Invention:	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB
First Named Inventor/Applicant Name:	ROBERT EBERHARDT
Filer:	Ralph Eric Locher/Michelle Janca
Attorney Docket Number:	VP-22858

Filed as Large Entity

Filing Fees for U.S. National Stage under 35 USC 371

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:				
UTILITY APPL ISSUE FEE	1501	1	1200	1200

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1200**

Electronic Acknowledgement Receipt	
EFS ID:	44823237
Application Number:	16980449
International Application Number:	
Confirmation Number:	1867
Title of Invention:	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB
First Named Inventor/Applicant Name:	ROBERT EBERHARDT
Customer Number:	24131
Filer:	Ralph Eric Locher/Michelle Janca
Filer Authorized By:	Ralph Eric Locher
Attorney Docket Number:	VP-22858
Receipt Date:	25-JAN-2022
Filing Date:	14-SEP-2020
Time Stamp:	08:10:26
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1200
RAM confirmation Number	E20221O910583314
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	VP22858.pdf	329217 0522eeb71eea3eed49a2d951ce4bf00deaa85b34	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	38038 c27e8a754b915c9f4a1e23ccde2c6f378a833f34	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	367255		

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

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

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NOTICE OF ALLOWANCE AND FEE(S) DUE

24131 7590 10/27/2021

LERNER GREENBERG STEMER LLP
P O BOX 2480
HOLLYWOOD, FL 33022-2480

EXAMINER
ESLAMI, MATTHEW M

ART UNIT	PAPER NUMBER
1748	

DATE MAILED: 10/27/2021

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/980,449	09/14/2020	ROBERT EBERHARDT	VP-22858	1867

TITLE OF INVENTION: CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	01/27/2022

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

24131 7590 10/27/2021
LERNER GREENBERG STEMER LLP
P O BOX 2480
HOLLYWOOD, FL 33022-2480

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/980,449	09/14/2020	ROBERT EBERHARDT	VP-22858	1867

TITLE OF INVENTION: CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB

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nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	01/27/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
ESLAMI, MATTHEW M	1748	162-348000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑Issue Fee ❑Publication Fee (if required) ❑Advance Order - # of Copies _____

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❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
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NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/980,449	09/14/2020	ROBERT EBERHARDT	VP-22858	1867

24131 7590 10/27/2021

LERNER GREENBERG STEMER LLP
P O BOX 2480
HOLLYWOOD, FL 33022-2480

EXAMINER	
ESLAMI, MATTHEW M	
ART UNIT	PAPER NUMBER
1748	

DATE MAILED: 10/27/2021

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. 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 30 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. 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.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 16/980,449	Applicant(s) EBERHARDT et al.	
	Examiner MATTHEW M ESLAMI	Art Unit 1748	AIA (FITF) Status Yes

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

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to Amendment filed on 09/22/2021.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ 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.

3. ☑ The allowed claim(s) is/are 15,17-24,26-27 and 29-32 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☑ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☑ All b) ☐ Some* c) ☐ None of the:

   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)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/MATTHEW M ESLAMI/ Examiner, Art Unit 1748	/Eric Hug/ Primary Examiner, Art Unit 1748

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Response to Amendment

2. The amendment filed 09/22/2021 has been entered. Claims 15, 17-24, 26, 27 and 29-32 remain pending in the application. The Applicant amended claims 1-14.

Allowable Subject Matter

3. Claims 15, 17-24, 26, 27 and 29-32 are allowed.

The following is an examiner's statement of reasons for allowance:

The claims are allowed, because the prior art does not disclose or suggest a clothing or a seam felt for a machine for producing a fibrous material, paper, board, tissue or pulp web, comprising: said seam having a loop density of between 64% and 90%; and said diameter LD of said seam loops and said diameter MDYD of said associated MD threads having a ratio LD/MDYD of between 2.7 and 3.6.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

4. Applicant's arguments filed on September 22, 2021 have been considered and they are persuasive.

In view of the arguments with respect to "flat-woven fabrics" and "monofilaments with a round cross section" and the previous amendment to the claims, the rejections under 35 U.S.C. 112, second

paragraph, set forth previously have been withdrawn. All remaining claimed features have been clearly defined and have support in the specification.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW M ESLAMI whose telephone number is (571)272-8710. The examiner can normally be reached on M-F 7:30 to 5:30.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Abbas Rashid can be reached on (571)270-7457. 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 https://ppair-my.uspto.gov/pair/PrivatePair. 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.

/MATTHEW M ESLAMI/
Examiner, Art Unit 1748

/Eric Hug/
Primary Examiner, Art Unit 1748

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/980,449	EBERHARDT et al.
	Examiner	**Art Unit**
	MATTHEW M ESLAMI	1748

CPC								
Symbol							**Type**	**Version**
D21F	/	7	/	083			F	2013-01-01
D21F	/	7	/	10			I	2013-01-01

CPC Combination Sets								
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

/MATTHEW M ESLAMI/ Examiner, Art Unit 1748	19 October 2021	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	15	
/Eric Hug/ Primary Examiner, Art Unit 1748	20 October 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	3

U.S. Patent and Trademark Office — Part of Paper No.: 20211019

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/980,449	EBERHARDT et al.
	Examiner	**Art Unit**
	MATTHEW M ESLAMI	1748

INTERNATIONAL CLASSIFICATION					
CLAIMED					
D21F7/08	/	7	/	08	
D21F7/10	/	7	/	10	

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

/MATTHEW M ESLAMI/ Examiner, Art Unit 1748	19 October 2021	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	15	
/Eric Hug/ Primary Examiner, Art Unit 1748	20 October 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	3

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/980,449	EBERHARDT et al.
	Examiner	**Art Unit**
	MATTHEW M ESLAMI	1748

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

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		10	4	19		28								
	2		11	5	20	12	29								
	3		12	6	21	13	30								
	4		13	7	22	14	31								
	5		14	8	23	15	32								
	6	1	15	9	24										
	7		16		25										
	8	2	17	10	26										
	9	3	18	11	27										

/MATTHEW M ESLAMI/ Examiner, Art Unit 1748	19 October 2021	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	15	
/Eric Hug/ Primary Examiner, Art Unit 1748	20 October 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	3

U.S. Patent and Trademark Office — Part of Paper No.: 20211019

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/980,449	EBERHARDT et al.
	Examiner	Art Unit
	MATTHEW M ESLAMI	1748

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

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

CLAIM		DATE								
Final	Original	02/24/2021	06/16/2021	08/24/2021	10/19/2021					
	1	-	-	-	-					
	2	-	-	-	-					
	3	-	-	-	-					
	4	-	-	-	-					
	5	-	-	-	-					
	6	-	-	-	-					
	7	-	-	-	-					
	8	-	-	-	-					
	9	-	-	-	-					
	10	-	-	-	-					
	11	-	-	-	-					
	12	-	-	-	-					
	13	-	-	-	-					
	14	-	-	-	-					
	15	✓	✓	O	=					
	16	✓	✓	-	-					
	17	✓	✓	O	=					
	18	✓	✓	O	=					
	19	✓	✓	O	=					
	20	✓	✓	O	=					
	21	✓	✓	O	=					
	22	✓	✓	O	=					
	23	✓	✓	O	=					
	24	✓	✓	O	=					
	25	✓	-	-	-					
	26	✓	✓	O	=					
	27	✓	✓	O	=					
	28	✓	✓	-	-					
	29	✓	✓	O	=					
	30	✓	✓	O	=					
	31	✓	✓	O	=					
	32	✓	✓	O	=					

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/980,449	EBERHARDT et al.
	Examiner	Art Unit
	MATTHEW M ESLAMI	1748

CPC - Searched*		
Symbol	**Date**	**Examiner**
D21F7/083	02/22/2021	MME
D21F7/10	02/22/2021	MME
D21F1/0036	02/22/2021	MME
D21F1/0054	02/22/2021	MME

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	**Date**	**Examiner**
PE2E text search	02/22/2021	MME
CPC search	02/22/2021	MME
Assignee search	02/22/2021	MME
Inventor(s) search	02/22/2021	MME
Consulted with Jacob Minskey	02/23/2021	MME
Updated search, please see attached searched history.	06/16/2021	MME
Updated search, please see attached searched history.	08/24/2021	MME
Updated text search, please see attached searched history.	10/19/2021	MME

/MATTHEW M ESLAMI/ Examiner, Art Unit 1748	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/980,449	EBERHARDT et al.
	Examiner	Art Unit
	MATTHEW M ESLAMI	1748

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
	Limited text search, see the attached searched history.	10/19/2021	MME

/MATTHEW M ESLAMI/ Examiner, Art Unit 1748	

Bibliographic Data

Application No: 16/980,449

Foreign Priority claimed: ◉ Yes ○ No

35 USC 119 (a-d) conditions met: ☑ Yes ☐ No ☐ Met After Allowance

Verified and Acknowledged: /MATTHEW M ESLAMI/ Examiner's Signature | Initials

Title: CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
09/14/2020	162	1748	VP-22858
RULE			

APPLICANTS

VOITH PATENT GMBH, HEIDENHEIM, GERMANY

INVENTORS

ROBERT EBERHARDT, ELLWANGEN, GERMANY

SUSANNE KLASCHKA, KOELN, GERMANY

CONTINUING DATA

This application is a 371 of PCT/EP2019/055955 03/11/2019

FOREIGN APPLICATIONS

GERMANY DE10 2018 105 956.6 03/15/2018

IF REQUIRED, FOREIGN LICENSE GRANTED**

10/08/2020

STATE OR COUNTRY

GERMANY

ADDRESS

LERNER GREENBERG STEMER LLP
P O BOX 2480
HOLLYWOOD, FL 33022-2480
UNITED STATES

FILING FEE RECEIVED

$1,580

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L9	1705	(cloth$3 OR web OR seam ADJ felt) WITH (multi$3 ADJ layers ADJ laminate)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/02/22 09:42 AM
L46	20	(mono$filament$1 WITH (round OR circul$4) ADJ cross ADJ section$3) AND (flat$1woven ADJ fabric)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/10/19 12:45 PM
L47	20	(cloth$3 OR web OR fabric OR seam ADJ felt) SAME (mono$filament$1 WITH (round OR circul$4) ADJ cross ADJ section$3) AND (flat$1woven ADJ fabric)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/10/19 12:46 PM
L48	73	((("EBERHARDT") near3 ("ROBERT")) OR (("KLASCHKA") near3 ("SUSANNE"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2021/10/19 12:48 PM
L49	1006	((("VOITH") near3 ("PATENT") near3 ("GMBH"))).AS,AANM.	(USPAT)	OR	ON	ON	2021/10/19 12:52 PM
L50	1	((mono$filament$1 WITH (round OR circul$4) ADJ cross ADJ section$3) AND (flat$1woven ADJ fabric)).clm.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/10/19 12:58 PM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	3	(cloth$3 OR seam ADJ felt) WITH (multi$3 ADJ layer ADJ laminate).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2021/10/19 12:54 PM
N2	3	((cloth$3 OR seam ADJ felt) WITH (multi$3 ADJ	(US-PGPUB; USPAT)	OR	ON	ON	2021/10/19 12:55 PM

		layer ADJ laminate)).clm.					
N3	19	((cloth$3 OR web OR seam ADJ felt) WITH (multi$3 ADJ layers ADJ laminate)).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2021/10/19 12:56 PM
N4	4	(L9 AND (machine ADJ direction ADJ threads) OR (MD ADJ threads) SAME loop$2).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2021/10/19 12:57 PM
N5	1	((mono$filament$1 WITH (round OR circul$4) ADJ cross ADJ section$3) AND (flat$1woven ADJ fabric)).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2021/10/19 12:59 PM

Practitioner's Docket No.: VP-22858 BOX AF

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	16/980,449	Confirmation No. 1867
Filing Date	:	September 14, 2020	
Applicant	:	Robert Eberhardt, et al.	
Title	:	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB	
TC/AU	:	1748	
Examiner	:	Matthew M. Eslami	
Docket No.	:	VP-22858	
Customer No.	:	24131	

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

RESPONSE and INTERVIEW SUMMARY

Sir:

Responsive to the Office action dated August 31, 2021, kindly consider the following:

- **Remarks/Arguments** begin on page 2 of this paper.

REMARKS/ARGUMENTS

Reconsideration of the application is requested.

Claims 15, 17-24, 26, 27 and 29-32 remain in the application and are subject to examination. No claims have been amended, added or canceled herein. Claims 1-14, 16, 25 and 28 were previously canceled.

In "Claim Rejections – 35 USC § 112" in item 5 on page 3 of the above-identified Office Action, claims 15 and 18 have been rejected as being indefinite under 35 U.S.C. § 112.

More specifically, the Examiner has stated that "In claim 15 [sic], the phrase 'one or a plurality of flat-woven fabrics' of a base structure renders the claim indefinite because the next paragraph of claim 15 [sic] recites the base structure includes monofilaments with a round cross section."

The Examiner continues by stating that "Since 'flat-woven fabrics' and 'round cross-section' are mutually exclusive, it is unclear how the base structure contains both configurations."

Regarding claim 18, the Examiner states that the claim is unclear in the context of claim 15.

The courtesy of Examiner Eslami in calling undersigned Counsel on July 28, 2021 to discuss the above-described rejections is appreciated. After consulting with the Applicant, Counsel called the Examiner back on August 5, 2021 but was unable to speak to the Examiner.

Regarding the rejections, it is believed that a misunderstanding exists. The claims call for "flat-woven ***fabrics***" and "***monofilaments*** with a round cross section." The claims do not call for a flat fabric and a round fabric. On the contrary, it is believed to be easily understood that round filaments can be woven into a flat fabric.

The term "flat woven" in the instant application does not indicate if flat or round filaments are used. It describes a fabric, which is woven on the loom as a flat piece of cloth.

The alternative to a flat woven fabric is a round-woven or endlessly woven fabric. If the shuttle with the weft yarn moves left to right in the loom, it interweaves with every second warp yarn only, and when it returns from right to left, it interweaves with the other warp yarns. Therefore, it is possible to create a tubular structure directly in the loom without any seams. Fire hoses are woven in a similar way.

The drawback of round-weaving paper machine fabrics is that the length of the fabric loop has to be known at the time of the weaving and thus no bulk weaving is possible.

Therefore, the invention of the instant application is directed towards using a flat-woven piece of cloth, which is cut to the desired length. In this case, the longitudinal ends have to be connected somehow (e.g. welded) in order to create a loop. Due to technological advances , this is now possible with a sufficient strength without visible markings.

The concept behind claim 18 is that it is not necessary to weld the two ends of one flat weave ("identical flat woven fabric") together in order to create a loop.
One could also use two different flat woven pieces and create a loop by welding one end of one weave to one end of the other weave. In that case, two welds are needed to create the loop.

It is accordingly believed that there is no conflict between the "flat-woven ***fabrics***" and "***monofilaments*** with a round cross section" in the claims.

It is accordingly believed that the claims meet the requirements of 35 U.S.C. § 112(b).

In view of the foregoing, reconsideration and allowance of claims 15, 17-24, 26, 27 and 29-32, are solicited.

In the event the Examiner should still find any of the claims to be unpatentable, Counsel would appreciate receiving a telephone call so that, if possible, patentable language can be worked out.

If an extension of time is required, petition for extension is herewith made. Any extension fee associated therewith should be charged to the Deposit Account of undersigned Counsel Lerner Greenberg Stemer LLP, No. 12-1099.

Please charge any other fees that might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of undersigned Counsel Lerner Greenberg Stemer LLP, No. 12-1099.

Respectfully submitted,

/Laurence A. Greenberg/
Laurence A. Greenberg
Reg. No. 29308

September 22, 2021

Lerner Greenberg Stemer LLP
P.O. Box 2480
Hollywood, Florida 33022-2480
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Fax: (954) 925-1101
Email: lgreenberg@patentusa.com

LAG/lg

Electronic Acknowledgement Receipt	
EFS ID:	43836116
Application Number:	16980449
International Application Number:	
Confirmation Number:	1867
Title of Invention:	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB
First Named Inventor/Applicant Name:	ROBERT EBERHARDT
Customer Number:	24131
Filer:	Laurence Arnold Greenberg
Filer Authorized By:	
Attorney Docket Number:	VP-22858
Receipt Date:	22-SEP-2021
Filing Date:	14-SEP-2020
Time Stamp:	16:41:59
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		VP-22858-am3.pdf	100964 c016c219f09027863e44425f1a099618bd5bd122	yes	5

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Applicant Arguments/Remarks Made in an Amendment	2	5
Warnings:			
Information:			
	Total Files Size (in bytes):	100964	

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/980,449	09/14/2020	ROBERT EBERHARDT	VP-22858	1867

24131 7590 08/31/2021
LERNER GREENBERG STEMER LLP
P O BOX 2480
HOLLYWOOD, FL 33022-2480

EXAMINER	
ESLAMI, MATTHEW M	

ART UNIT	PAPER NUMBER
1748	

NOTIFICATION DATE	DELIVERY MODE
08/31/2021	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):

docket@patentusa.com
office@patentusa.com
vrahimis@patentusa.com

Office Action Summary	Application No. 16/980,449	Applicant(s) EBERHARDT et al.	
	Examiner MATTHEW M ESLAMI	Art Unit 1748	AIA (FITF) Status Yes

-- 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 MONTHS 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 08 August 2021.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

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) 15,17-24,26-27 and 29-32 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 15,17-24,26-27 and 29-32 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

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) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 08/12/2021 has been entered.

Response to Amendment

3. The amendment after final filed on 07/09/2021 has been entered. Claims 1-14 were previously canceled. Claims 15 and 29 are amended. Claims 16, 25, and 28 are canceled. Applicant's amendment after final obviated the rejection of claims 15, 17-24, 26, 27 and 29-32 under 35 U.S.C. 103 previously set forth in the Final Office Action mailed on 06/23/2021. However, claims 15, 17-24, 26, 27 and 29-32 are still rejected under 35 U.S.C. 112(b) for the reasons provided hereinafter.

Claim Rejections - 35 USC § 112

4. The following is a quotation of 35 U.S.C. 112(b):

> (b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 15 and 18 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor (or for applications subject to pre-AIA 35 U.S.C. 112, the applicant), regards as the invention.

In claim 1, the phrase "one or a plurality of flat-woven fabrics" of a base structure renders the claim indefinite because the next paragraph of claim 1 recites the base structure includes monofilaments with a round cross section. Since "flat-woven fabrics" and "round cross section" are mutually exclusive, it is unclear how the base structure contains both configurations. The language of this claim is vague and unclear, so appropriate correction is required.

In claim 18, the phrase "said flat-woven fabrics…aid interconnected long-side ends belong to an identical flat-woven fabric or to different flat-woven fabrics." Emphasis added. Again, it is unclear what it means "flat-woven fabric or to different flat-woven fabrics" in the context of claims 1 and 18. Appropriate correction is required.

Allowable Subject Matter

6. Claim 15 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), 2nd paragraph, set forth in this Office action.

7. Claim 17, 19-24, 26-27, and 29-32 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 15, this claim was amended to include these two limitations that the seam loop having a loop density of between 64% and 90% and that the ratio LD/MDYD of is between 2.7 and 3.6, in which these two limitations define patentable subject matter over the available prior art.

Regarding claims 17, 19-24, 26-27, and 29-32, these claims depend directly/indirectly upon claim 15 and therefore, define patentable subject matter over the available prior art

Response to Arguments

9. Applicant's arguments filed on 07/09/2021 have been fully considered and they are persuasive.

Applicant’s amendment after final has overcome the rejection of claims 15, 17-24, 26, 27 and 29-32. In particular, claim 15 was amended to include these two limitations that the seam loop having a loop density of between 64% and 90% and that the ratio LD/MDYD of is between 2.7 and 3.6, in which these two limitations define patentable subject matter over the available prior art. As noted hereinbefore with respect to 112b rejection, the respective base claim 15 and the dependent claim 18 suffer from the languages such as “one or a plurality of flat-woven fabrics” or “an identical flat-woven

fabric or to different flat-woven fabrics" which render the claims indefinite and therefore, appropriate correction is required.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW M ESLAMI whose telephone number is (571)272-8710. The examiner can normally be reached on M-F 7:30 to 5:30.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Abbas Rashid can be reached on (571)270-7457. 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 https://ppair-my.uspto.gov/pair/PrivatePair. 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.

/MATTHEW M ESLAMI/
Examiner, Art Unit 1748
/Eric Hug/
Primary Examiner, Art Unit 1748

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/980,449	EBERHARDT et al.
	Examiner	Art Unit
	MATTHEW M ESLAMI	1748

CPC - Searched*		
Symbol	**Date**	**Examiner**
D21F7/083	02/22/2021	MME
D21F7/10	02/22/2021	MME
D21F1/0036	02/22/2021	MME
D21F1/0054	02/22/2021	MME

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	**Date**	**Examiner**
PE2E text search	02/22/2021	MME
CPC search	02/22/2021	MME
Assignee search	02/22/2021	MME
Inventor(s) search	02/22/2021	MME
Consulted with Jacob Minskey	02/23/2021	MME
Updated search, please see attached searched history.	06/16/2021	MME
Updated search, please see attached searched history.	08/24/2021	MME

/MATTHEW M ESLAMI/ Examiner, Art Unit 1748	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/980,449	EBERHARDT et al.
	Examiner	Art Unit
	MATTHEW M ESLAMI	1748

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/MATTHEW M ESLAMI/ Examiner, Art Unit 1748	

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/980,449	EBERHARDT et al.
	Examiner	Art Unit
	MATTHEW M ESLAMI	1748

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

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

CLAIM		DATE								
Final	Original	02/24/2021	06/16/2021	08/24/2021						
	1	-	-	-						
	2	-	-	-						
	3	-	-	-						
	4	-	-	-						
	5	-	-	-						
	6	-	-	-						
	7	-	-	-						
	8	-	-	-						
	9	-	-	-						
	10	-	-	-						
	11	-	-	-						
	12	-	-	-						
	13	-	-	-						
	14	-	-	-						
	15	✓	✓	✓						
	16	✓	✓	-						
	17	✓	✓	✓						
	18	✓	✓	✓						
	19	✓	✓	✓						
	20	✓	✓	✓						
	21	✓	✓	✓						
	22	✓	✓	✓						
	23	✓	✓	✓						
	24	✓	✓	✓						
	25	✓	-	-						
	26	✓	✓	✓						
	27	✓	✓	✓						
	28	✓	✓	-						
	29	✓	✓	✓						
	30	✓	✓	✓						
	31	✓	✓	✓						
	32	✓	✓	✓						

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L40	3	(cloth$3 OR web OR seam ADJ felt) WITH (multi$3 ADJ layer$2 ADJ laminate) AND loop ADJ density	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/08/24 04:19 PM
L41	12	(cloth$3 OR web OR fabric OR seam ADJ felt) SAME (mono$filament$1 WITH (round OR circul$4) ADJ cross ADJ section$3) AND loop ADJ density	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/08/24 04:20 PM
L42	3	(cloth$3 OR web OR fabric OR seam ADJ felt) SAME (mono$filament$1 WITH (round OR circul$4) ADJ cross ADJ section$3) AND loop ADJ density	(US-PGPUB; USPAT)	OR	ON	ON	2021/08/24 04:21 PM
L43	12	(cloth$3 OR web OR fabric OR seam ADJ felt) SAME (mono$filament$1 WITH (round OR circul$4) ADJ cross ADJ section$3) AND loop ADJ density	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/08/24 04:25 PM
L44	73	((("EBERHARDT") near3 ("ROBERT")) OR (("KLASCHKA") near3 ("SUSANNE"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2021/08/24 05:16 PM
L45	1001	((("VOITH") near3 ("PATENT") near3 ("GMBH"))).AS,AANM.	(USPAT)	OR	ON	ON	2021/08/24 05:17 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	16/980,449	Filing Date	2020-09-14	Docket Number (if applicable)	VP-22858	Art Unit	1748
First Named Inventor	Robert Eberhardt, et al.			Examiner Name	Matthew M. Eslami		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☒ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

☐ Other _____

☐ Enclosed

☐ Amendment/Reply

☐ Information Disclosure Statement (IDS)

☐ Affidavit(s)/ Declaration(s)

☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____ (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.

☒ The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 121099

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

Applicant Signature

PTO/SB/30EFS (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/LAURENCE A. GREENBERG/	Date (YYYY-MM-DD)	2020-08-12
Name	LAURENCE A. GREENBERG	Registration Number	28308

This collection of information is required by 37 CFR 1.114. 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 1.11 and 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.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal	
Application Number:	16980449
Filing Date:	14-Sep-2020
Title of Invention:	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB
First Named Inventor/Applicant Name:	ROBERT EBERHARDT
Filer:	Laurence Arnold Greenberg/ALEXIA VRAHIMIS
Attorney Docket Number:	VP-22858
Filed as Large Entity	
Filing Fees for U.S. National Stage under 35 USC 371	

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($)
Miscellaneous:				
RCE- 1ST REQUEST	1801	1	1360	1360
		Total in USD ($)		**1360**

Electronic Acknowledgement Receipt	
EFS ID:	43490525
Application Number:	16980449
International Application Number:	
Confirmation Number:	1867
Title of Invention:	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB
First Named Inventor/Applicant Name:	ROBERT EBERHARDT
Customer Number:	24131
Filer:	Laurence Arnold Greenberg/Michelle Janca
Filer Authorized By:	Laurence Arnold Greenberg
Attorney Docket Number:	VP-22858
Receipt Date:	12-AUG-2021
Filing Date:	14-SEP-2020
Time Stamp:	11:03:05
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1360
RAM confirmation Number	E20218BB03434403
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	VP-22858-RCE.pdf	1349952 8927cabba57cd757594f1ff33b0aca5b7e6169db	no	3
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	38345 890dddb822350bcbb68278affa1f79309cc2348d	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1388297		

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/980,449	09/14/2020	ROBERT EBERHARDT	VP-22858	1867

24131 7590 08/09/2021
LERNER GREENBERG STEMER LLP
P O BOX 2480
HOLLYWOOD, FL 33022-2480

EXAMINER	
ESLAMI, MATTHEW M	

ART UNIT	PAPER NUMBER
1748	

NOTIFICATION DATE	DELIVERY MODE
08/09/2021	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):

docket@patentusa.com
office@patentusa.com
vrahimis@patentusa.com

Advisory Action Before the Filing of an Appeal Brief	**Application No.** 16/980,449	**Applicant(s)** EBERHARDT et al.	
	Examiner MATTHEW M ESLAMI	**Art Unit** 1748	**AIA (FITF) Status** Yes

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

THE REPLY FILED 09 July 2021 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

NO NOTICE OF APPEAL FILED

1. ☑ The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCEs are not permitted in design applications. The reply must be filed within one of the following time periods:
   a) ☐ The period for reply expires ____ months from the mailing date of the final rejection.
   b) ☑ The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
   c) ☐ A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection.The current period for reply expires ____ months from the mailing date of *the prior Advisory Action* or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.
   Examiner Note: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANTS FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37CFR 41.37(a).

AMENDMENTS

3. ☑ The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   a) ☑ They raise new issues that would require further consideration and/or search (see NOTE below);
   b) ☐ They raise the issue of new matter (see NOTE below);
   c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.
   NOTE: Claim16 as amended has issues that require further consideration (See 37CFR 1.116 and 41.33(a)).
4. ☐ The amendments are not in compliance with 37CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicants reply has overcome the following rejection(s): _____
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☐ For purposes of appeal, the proposed amendment(s):(a)☐ will not be entered, or (b)☐ will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____
9. ☐ The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
10. ☐ The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
11. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

12. ☐ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: _____.
13. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
14. ☑ Other: Interview summary is attached..

STATUS OF CLAIMS

15. The status of the claim(s) is (or will be) as follows:
    Claim(s) allowed:_____.
    Claim(s) objected to:_____.
    Claim(s) rejected:15-24 and 26-32.
    Claim(s) withdrawn from consideration:_____.

/MATTHEW M ESLAMI/ Examiner, Art Unit 1748	/Eric Hug/ Primary Examiner, Art Unit 1748

Examiner-Initiated Interview Summary	**Application No.** 16/980,449	**Applicant(s)** EBERHARDT et al.		
	Examiner MATTHEW M ESLAMI	**Art Unit** 1748	**AIA (First Inventor to File) Status** Yes	**Page** 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	**Title**	**Type**
MATTHEW M ESLAMI	Examiner	Telephonic
Laurence A. Greenberg	Attorney	

Date of Interview: 26 July 2021

Issues Discussed:

Other

The Examiner asked the Attorney for a change to the language of claims, however, the Attorney requested to contact his client before doing it.

/MATTHEW M ESLAMI/ Examiner, Art Unit 1748	/Eric Hug/ Primary Examiner, Art Unit 1748

Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04
Please further see:
MPEP 713.04
Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)
37 CFR § 1.2 Business to be transacted in writing

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

DO NOT ENTER: /M.M.E./ 08/03/2021

Practitioner's Docket No.: VP-22858 BOX AF

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	16/980,449	Confirmation No. 1867
Filing Date	:	September 14, 2020	
Applicant	:	Robert Eberhardt, et al.	
Title	:	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB	
TC/AU	:	1748	
Examiner	:	Matthew M. Eslami	
Docket No.	:	VP-22858	
Customer No.	:	24131	

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

AMENDMENT under 37 CFR § 1.116 and INTERVIEW SUMMARY

Sir:

Responsive to the final Office action dated June 23, 2021, kindly amend the above-identified application as follows:

- **Amendments to the Claims** are reflected in the listing of claims, which begins on page 2 of this paper.

- **Remarks/Arguments** begin on page 6 of this paper.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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 16/980,449	Filing Date 09/14/2020	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

	(Column 1)	(Column 2)			
FOR	NUMBER FILED	NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	07/09/2021	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 15	Minus	** 20	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 1	Minus	*** 3	= 0		x $480 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/ROLITA M WIMBUSH/
*** 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.	

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.

Practitioner's Docket No.: VP-22858 BOX AF

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	16/980,449	Confirmation No. 1867
Filing Date	:	September 14, 2020	
Applicant	:	Robert Eberhardt, et al.	
Title	:	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB	
TC/AU	:	1748	
Examiner	:	Matthew M. Eslami	
Docket No.	:	VP-22858	
Customer No.	:	24131	

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

AMENDMENT under 37 CFR § 1.116 and INTERVIEW SUMMARY

Sir:

Responsive to the final Office action dated June 23, 2021, kindly amend the above-identified application as follows:

- **Amendments to the Claims** are reflected in the listing of claims, which begins on page 2 of this paper.

- **Remarks/Arguments** begin on page 6 of this paper.

Electronic Acknowledgement Receipt	
EFS ID:	43207465
Application Number:	16980449
International Application Number:	
Confirmation Number:	1867
Title of Invention:	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB
First Named Inventor/Applicant Name:	ROBERT EBERHARDT
Customer Number:	24131
Filer:	Laurence Arnold Greenberg
Filer Authorized By:	
Attorney Docket Number:	VP-22858
Receipt Date:	09-JUL-2021
Filing Date:	14-SEP-2020
Time Stamp:	11:39:37
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		VP-22858-amf.pdf	113272 16782c253bb7ed2c504c0adad070aff3c5a41658	yes	11

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Applicant Arguments/Remarks Made in an Amendment	6	11
	Claims	2	5
	Response After Final Action	1	1
Warnings:			
Information:			
	Total Files Size (in bytes):	113272	

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.

REMARKS/ARGUMENTS

Reconsideration of the application is requested.

Claims 15, 17-24, 26, 27 and 29-32 are now in the application and are subject to examination. Claims 15 and 29 have been amended. No claims have been added herein. Claims 1-14, 16, 25 and 28 have been canceled.

In "Claim Rejections – 35 USC § 103" in item 5 on pages 3-10 of the Office Action, claims 15-24 and 26-32 have been rejected as being obvious over U.S. Patent Application Publication No. 2009/0211722 to Crook, et al. (hereinafter "Crook") in view of U.S. Patent No. 6,189,577 to Lee under 35 U.S.C. § 103.

As will be explained below, although it is believed that claim 15 was patentable over the cited art in its original form, the claim has been amended in an effort to even more clearly define the invention of the instant application.

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful. Claim 15 calls for, *inter alia*, a clothing or a seam felt for a machine for producing a fibrous material, paper, board, tissue or pulp web, comprising:

> a base structure including a two-layer laminate structure formed of one or a plurality of flat-woven fabrics, said base structure having two end sides;
>
> said laminate structure having MD threads being monofilaments with a round cross section forming seam loops at said two end sides of said base structure, said seam loops interconnecting said two layers of said laminate structure, said seam loops having a diameter LD and said associated MD threads having a diameter MDYD;

a seam interconnecting said end sides to make the clothing endless, said seam being formed by interengaging said seam loops of said two end sides and an insertion of an insertion element;

said seam having a loop density of between 64% and 90%; and

said diameter LD of said seam loops and said diameter MDYD of said associated MD threads having a ratio LD/MDYD of between 2.7 and 3.6.

Support for the changes to claim 15 is found in original claims 16 and 28 of the instant application.

As mentioned above, the claims have been rejected as being obvious over Crook in view of Lee. However, it is believed that amended claim 15 is patentable over the prior art, as will be explained below.

The courtesy of Examiner Eslami in discussing claim 15, the Response to Arguments, the Lee reference and U.S. Patent No. 4,621,663 with undersigned Counsel by telephone on July 8, 2021, is appreciated.

In that conversation, Counsel pointed out to the Examiner that claim 15 calls for round MD (machine direction) threads.

The Examiner cited the Lee reference as showing round MD threads. However, it is respectfully noted that the Examiner has interpreted the disclosure of Lee incorrectly.

In the penultimate paragraph on page 11 of the Office Action, the Examiner relies on column 7, lines 3-8 of Lee to teach round diameter MD yarns,. However, the portion of Lee which the Examiner has quoted explicitly mentions "MD yarns 22-25 which were flat polyester monofilament yarns." The CMD (cross machine direction) yarns are round, whereas the MD yarns are flat polyester monofilaments in Lee.

In the previous paragraph on page 11 of the Office Action, the Examiner also relies on U.S. Patent No. 4,621,663, but once again the Examiner's interpretation is not correct. In U.S. Patent No. 4,621,663, reference is made to high aspect ratio yarns on the surface. Those yarns are merely supported by a conventional fabric. Thus, like Lee, U.S. Patent No. 4,621,663 also does not teach loops on round MD threads.

With regard to obviousness, the Examiner argues further that Lee describes the modification of the aspect ratio of the MD threads, that by modifying that aspect ratio, the MDYD also changes, and that a person of skill in the art would thus arrive at the ratio of between 2.5 and 4 without further ado.

However, what the Examiner entirely disregards is the fact that the aspect ratio of a thread with a round diameter always equals 1 and cannot be changed.

Therefore, if the person of skill in the art were to modify the aspect ratio in order to arrive at the MDYD/LD ratio recited in claim 15 of the instant application, he or she could not achieve that with yarns that are also the round MD threads of claim 15.

Therefore, if the person of skill in the art were to use round MD threads, then Lee does not provide any hint as to how the MDYD/LD ratio of claim 15 can be achieved.

In the telephone interview, while acknowledging the arguments discussed above, the Examiner stated that more structure should be added to claim 15. Therefore, the limitations of claims 16 and 28 have been added to claim 15 so that the claim now calls for the seam having a loop density of between 64% and 90%, and the diameter LD of the seam loops and the diameter MDYD of the associated MD threads having a ratio LD/MDYD of between 2.7 and 3.6.

Claims 16 and 28 have been rejected in the Office Action. However, the limitations od those claims are not obvious when applied to a clothing having round MD threads which are not disclosed in the prior art, as explained above.

Clearly, neither Crook nor Lee disclose:

> a laminate structure having MD threads being monofilaments with a round cross section forming seam loops at two end sides of a base structure,
>
> the seam having a loop density of between 64% and 90%, and
>
> the diameter LD of the seam loops and the diameter MDYD of the associated MD threads having a ratio LD/MDYD of between 2.7 and 3.6,

as recited in claim 15 of the instant application.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either teach or suggest the limitations of claim 15. Claim 15 is, therefore, believed to be patentable over the art.

The dependent claims are believed to be patentable as well because they all are ultimately dependent on claim 15.

In view of the foregoing, reconsideration and allowance of claims 15, 17-24, 26, 27 and 29-32, are solicited.

In the event the Examiner should still find any of the claims to be unpatentable, Counsel would appreciate receiving a telephone call so that, if possible, patentable language can be worked out.

In the alternative, the entry of the Amendment is requested, as it is believed to place the application in better condition for appeal, without requiring extension of the field of search.

If an extension of time is required, petition for extension is herewith made. Any extension fee associated therewith should be charged to the Deposit Account of undersigned Counsel Lerner Greenberg Stemer LLP, No. 12-1099.

Please charge any other fees that might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of undersigned Counsel Lerner Greenberg Stemer LLP, No. 12-1099.

Respectfully submitted,

/Laurence A. Greenberg/
Laurence A. Greenberg
Reg. No. 29308

July 9, 2021

Lerner Greenberg Stemer LLP
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Hollywood, Florida 33022-2480
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Fax: (954) 925-1101
Email: lgreenberg@patentusa.com

LAG/rmr

CLAIM AMENDMENTS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-14 (canceled).

Claim 15 (currently amended). A clothing or a seam felt for a machine for producing a fibrous material, paper, board, tissue or pulp web, comprising:

a base structure including a two-layer laminate structure formed of one or a plurality of flat-woven fabrics, said base structure having two end sides;

said laminate structure having MD threads being monofilaments with a round cross section forming seam loops at said two end sides of said base structure, said seam loops interconnecting said two layers of said laminate structure, said seam loops having a diameter LD and said associated MD threads having a diameter MDYD;

a seam interconnecting said end sides to make the clothing endless, said seam being formed by interengaging said seam loops of said two end sides and an insertion of an insertion element;

said seam having a loop density of between 64% and 90%; and

said diameter LD of said seam loops and said diameter MDYD of said associated MD threads having a ratio LD/MDYD of between ~~2.5 and 4~~ 2.7 and 3.6.

Claim 16 (canceled).

Claim 17 (previously presented). The clothing according to claim 15, wherein at least one of said flat-woven fabrics have floats extending over two or a plurality of threads.

Claim 18 (previously presented). The clothing according to claim 15, wherein each of said flat-woven fabrics has a first and a second long-side end, said two-layer laminate structure has at least one joint at which two of said long-side ends are interconnected, and said interconnected long-side ends belong to an identical flat-woven fabric or to different flat-woven fabrics.

Claim 19 (previously presented). The clothing according to claim 18, wherein said two long-side ends are interconnected by a welded connection or a laser transmission welded connection.

Claim 20 (previously presented). The clothing according to claim 18, wherein said at least one joint has an extent in a machine direction of less than 15 mm.

Claim 21 (previously presented). The clothing according to claim 20, wherein said extent of said at least one joint in the machine direction is less than 5 mm.

Claim 22 (previously presented). The clothing according to claim 18, wherein said at least one joint is made by connecting elements or connecting threads being welded to at least one or both of said long-side ends.

Claim 23 (previously presented). The clothing according to claim 22, wherein said connecting elements are connecting threads disposed in a CD direction of the clothing, and at most three connecting threads or at most two connecting threads are provided for a joint.

Claim 24 (previously presented). The clothing according to claim 23, wherein one or a plurality of said connecting threads are woven with MD threads of at least one of said long-side ends.

Claim 25 (canceled).

Claim 26 (previously presented). The clothing according to claim 15, wherein said diameter of said MD threads is between 0.15 mm and 0.7 mm.

Claim 27 (previously presented). The clothing according to claim 26, wherein said diameter of said MD threads is between 0.3 mm and 0.5 mm.

Claim 28 (canceled).

Claim 29 (currently amended). The clothing according to claim ~~28~~ 15, wherein said loop density of said seam is between 72% and 86%.

Claim 30 (previously presented). The clothing according to claim 15, which further comprises one or a plurality of layers of nonwoven fibers disposed at least on an upper side of the clothing for contacting the web.

Claim 31 (previously presented). The clothing according to claim 30, wherein at least some of said nonwoven fibers include or are formed of an elastomer or a polyurethane.

Claim 32 (previously presented). The clothing according to claim 15, which further comprises at least one strip-shaped flow-impeding element provided in a vicinity of said seam, said at least one strip-shaped flow-impeding element being configured to cause a permeability for at least one of air or water in said vicinity of said seam to be substantially identical to a remainder of the clothing.

Practitioner's Docket No.: VP-22858 BOX AF

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	16/980,449	Confirmation No. 1867
Filing Date	:	September 14, 2020	
Applicant	:	Robert Eberhardt, et al.	
Title	:	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB	
TC/AU	:	1748	
Examiner	:	Matthew M. Eslami	
Docket No.	:	VP-22858	
Customer No.	:	24131	

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

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Responsive to the final Office action dated June 23, 2021, kindly amend the above-identified application as follows:

- **Amendments to the Claims** are reflected in the listing of claims, which begins on page 2 of this paper.

- **Remarks/Arguments** begin on page 6 of this paper.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/980,449	09/14/2020	ROBERT EBERHARDT	VP-22858	1867

24131 7590 06/23/2021

LERNER GREENBERG STEMER LLP
P O BOX 2480
HOLLYWOOD, FL 33022-2480

EXAMINER	
ESLAMI, MATTHEW M	

ART UNIT	PAPER NUMBER
1748	

NOTIFICATION DATE	DELIVERY MODE
06/23/2021	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):

docket@patentusa.com
office@patentusa.com
vrahimis@patentusa.com

Office Action Summary	Application No. 16/980,449	Applicant(s) EBERHARDT et al.	
	Examiner MATTHEW M ESLAMI	Art Unit 1748	AIA (FITF) Status Yes

-- 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 MONTHS 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 03 May 2021.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

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) 15-24 and 26-32 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 15-24 and 26-32 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 03 May 2021 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).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

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) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Response to Amendment

2. The amendment filed on 05/03/2021 has been entered. Claims 15-24 and 26-32 remain pending in the application. Applicant's amendment obviated the specification, drawings, and all of the 112(b) rejections previously set forth in the Non-Final Office Action mailed on 03/03/2021. Claim 25 is canceled. Claim 1 is amended by incorporating therein the subject matter of rejected claim 25. There are sufficient support in the specification for the amended claim 1.

Claim Rejections - 35 USC § 103

3. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

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

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries for establishing a background for determining obviousness under 35 U.S.C. 103 are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 15-24 and 26-32 are rejected under 35 U.S.C. 103 as being unpatentable over **Robert CROOK; et al**. US 20090211722 A1 (**CROOK**) in view of **Henry J. Lee;** USP 6189577 B1 (**Lee)**.

Regarding claim 15, **CROOK** discloses: **A clothing or a seam felt for a machine for producing a fibrous material, paper, board, tissue or pulp web** (Abstract discloses a belt that is fundamentally the same as a clothing or seam felt), comprising: **a base structure** (para [0008]) including of **a two-layer laminate structure** (para [0050] and [0051]) formed of one or **a plurality of flat-woven fabrics** (Abstract), said **base structure having two end sides** (Abstract discloses "…The belt includes a flat woven material having a top side surface and a bottom side surface and two terminal ends separated in a machine direction."); said laminate structure having **MD threads being monofilaments with a round cross section** (Summary of the invention discloses "The present invention provides a method for weaving a papermakers fabric having a system of flat monofilament machine direction yarns (hereinafter MD yarns) which are stacked to control the permeability of the fabric.") **forming seam loops** (Abstract discloses "…Seam loops are located at the folds…" and at said two end sides of said base structure, said seam loops interconnecting said two layers of said laminate structure, said **seam loops having a diameter LD** (para [0004-0005] discloses seam loop and fabric tube, which is inherent and/or

self-evident to have a loop diameter for both circular and/or elliptical cross section or configuration and is known to one of ordinary skill in the art.) and said associated **MD threads having a diameter MDYD** (para [0004] discloses "…machine direction (MD) yarns at these ends or folds can then function as the seam loops…". Again any MD threads or yarns would inherently and/or self-evidently have MDYD as known to one of ordinary skill in the art.); **a seam interconnecting said end sides to make the clothing endless** (para [0004] discloses "…The ends or seam loops of the base can be aligned and connected with a pintle to form an endless base for the belt…"), said seam being formed by interengaging said seam loops of said two end sides and **an insertion of an insertion element** (para [0004] discloses "…The ends or seam loops of the base can be aligned and connected with a pintle to form an endless base for the belt…". A pintle can be an insertion element.);

However, **CROOK** does not expressly discloses: and **said diameter LD of said seam loops and said diameter MDYD of said associated MD threads having a ratio LD/MDYD of between 2.5 and 4**.

In the same field of art, **Lee** discloses: and **said diameter LD of said seam loops and said diameter MDYD of said associated MD threads having a ratio LD/MDYD of between 2.5 and 4** (**Lee** on Col. 5, lines 1-14. Examiner views that one of ordinary skill in the art would know that there is an inverse relationship between the aspect ratio of the MD yarns as disclosed by Lee and the MDYD value of the claimed invention. Knowing the aforesaid relationship (increasing MD yarns value, would result in decreasing the MDYD value and vice versa) would direct a worker to manipulate various ratios such as LD/MDYD ratio feature to arrive the intended goal by the claimed invention since the goal of cited reference and the claimed invention (as described in the applicant's disclosure on para [0044]) is to control/reduce/minimize the permeability at the join or joint area of the end sides of the clothing or seam felt or belt. Applicant's disclosure on para [0044] discloses "…Here, it is accepted that the

properties of the base structure and of the clothing can differ from the remainder of the clothing in the joint area. Instead, the aim is to keep this different area as small as possible in the MD direction…" Therefore, whether using the concept of aspect ratio of the MD yarns or alternatively, using the ratio of loop diameter of the seam loop over the MD yarn diameter (LD/MDYD), the end result is fundamentally the same since this is an optimizable feature absent of showing the criticality of the ratio of LD/MDYD. The criticality of the LD/MDYD in the claimed invention requires to demonstrate that this ratio provides unexpected results. In sum, the Examiner views that one of ordinary skill in the art would readily be able to calculate this ratio and optimize it accordingly knowing the fact that there is an inverse relationship between the aspect ratio of the MD yarns as disclosed by Lee and the MDYD value of the claimed invention. Thus, regardless of the ranges provided by this ratio LD/MDYD, the teaching of the cited reference **Lee** affirms that this ratio LD/MDYD is an optimizable feature and would be obvious to one of ordinary skill in the art.).

Therefore, it would have been obvious to a person of ordinary skill in the art prior to the effective filing date of the claimed invention to modify the belt or clothing or seam felt of **CROOK** by using the concept of aspect ratio of the MD yarns as taught by **Lee** so as to optimize the ratio of LD/MDYD of the clothing or seam felt of the claimed invention. Similarly, one of ordinary skill in the art, upon reading **Lee** disclosure, would also have been motivated to apply its teaching of utilizing the concept of the aspect ratio of the MD yarns to the ratio of loop diameter of the seam loop over the MD yarn diameter (LD/MDYD) so as to improve the operation of clothing or seam felt for the benefit of the claimed invention.

Regarding claim 16, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 15.

Lee further discloses: wherein said **ratio LD/MDYD of said diameter LD of said seam loops and said diameter MDYD of said associated MD threads is between 2.7 and 3.6** (**Lee** on Col. 5, lines 1-14. Examiner views that concept of aspect ratio of the MD yarns as disclosed by Lee can equally be applied to the LD/MDYD ratio feature recited by the claimed invention. Applicant's attention is respectfully directed to the full explanation hereinbefore with respect to claim 15).

Regarding claim 17, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 15. **Lee** further discloses: wherein **at least one of said flat-woven fabrics have floats extending over two or a plurality of threads** (Background of the invention, Col. 1, lines 45-49 discloses "…a dryer fabric having three layers of cross machine direction yarns interwoven with a system of flat monofilament machine direction yarns such that floats are created on both the top and bottom surfaces of the fabric. The floats tend to provide a smooth surface for the fabric.").

Regarding claim 18, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 15. **CROOK** further discloses: wherein **each of said flat- woven fabrics has a first and a second long-side end**, said two-layer laminate structure has **at least one joint at which two of said long-side ends are interconnected**, and said interconnected long-side ends belong to **an identical flat- woven fabric or to different flat-woven fabrics** (Fig. 1-4, para [0040] and [0043]).

Regarding claim 19, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 18. **CROOK** further discloses: wherein **said two long-side ends are interconnected by a welded connection or a laser transmission welded connection** (para [0006] discloses "… Further, as an array of parallel yams "reinforced" with needled batt, resins, or other nonwovens can be utilized in forming the described tube for the base, a strong single layer top ply fabric can be provided over the joined area, or

needled batt, added resin, thermoplastic "welding", etc. to keep the join in the two fabric ends intact for processing." Examiner views that welded connection or a laser transmission welded connection are common practice and is well known in the manufacturing of clothing or seam felt or belt industry.).

Regarding claim 20, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 18. **CROOK** further discloses: wherein said **at least one joint has an extent in a machine direction of less than 15 mm** (para [0046] discloses "After the base structure of FIG. 3 or FIG. 4 is formed, the seamable ends of the base structure can be joined together to form an endless belt, as illustrated in FIG. 5. Although the cited reference does not disclose exactly that one joint has an extent in a machine direction of less than 15 mm, but one of ordinary skill in the art would know that 15mm extent in MD is purely a design choice and can be manipulated accordingly.).

Regarding claim 21, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 20. **CROOK** further discloses: wherein **said extent of said at least one joint in the machine direction is less than 5 mm** (para [0046]. The same explanation provided for claim 20 applies to this claim as well and will not be repeated again to avoid redundancy.).

Regarding claim 22, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 18. **CROOK** further discloses: wherein said **at least one joint is made by connecting elements or connecting threads being welded to at least one or both of said long-side ends** (Figs. 3 and 4 and para [0006]. As noted previously with respect to the above claims, whether the joint is made by connecting elements or connecting threads being welded is simply a design choice and depends on the specific requirements the manufactures receive from their customer to make the clothing or seam felt or belt

and are common practice and is well known in the manufacturing of clothing or seam felt or belt industry.).

Regarding claim 23, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 22. **CROOK** further discloses: wherein **said connecting elements are connecting threads disposed in a CD direction of the clothing, and at most three connecting threads or at most two connecting threads are provided for a joint** (Figs. 3 and 4 and para [0004-0006]. The same explanation provided for claim 22 applies to this claim as well and will not be repeated again to avoid redundancy.).

Regarding claim 24, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 23. **CROOK** further discloses: wherein **one or a plurality of said connecting threads are woven with MD threads of at least one of said long- side ends** (Figs. 3 and 4 and para [0004-0006]. The same explanation provided for claim 23 applies to this claim as well and will not be repeated again to avoid redundancy.).

Regarding claim 26, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 15. **Lee** further discloses: wherein **said diameter of said MD threads is between 0.15 mm and 0.7 mm** (Col. 5, lines 38-44 discloses "In one example, a fabric was woven in accordance with FIGS. 1, 2 and 3, wherein the CMD yarns 11, 12, 13 were polyester monofilament yarns 0.6 mm in diameter interwoven with MD yarns 14-19 which were flat polyester monofilament yarns having a width of 1.12 mm and a height of 0.2 mm." Emphasis is added. Although, Lee discloses CMD yarns with diameter of 0.6 mm and MD yarns with a width 1.12mm and height of 0.2 mm, but one of ordinary skill in the art would know that the MD yarn or thread diameter of Lee can be calculated to be within the range of 0.15 mm to 0.7 mm disclosed by the claimed invention.).

Regarding claim 27, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 26. **Lee** further discloses: wherein **said diameter of said MD threads is between 0.3 mm and 0.5 mm** (Col. 5, lines 38-44. The same explanation provided for claim 26 applies to this claim as well and will not be repeated again to avoid redundancy.).

Regarding claim 28, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 15. **CROOK** further discloses: wherein **said seam has a loop density of between 64% and 90%** (para [0015] discloses "In accordance with still another feature of the present invention, a density of cross-direction fibers in a region of the seam loops is greater than a density of cross-direction fibers toward a center between the folds." Although, CROOK does not specifically disclose the loop density between 64% and 90%, but one of ordinary skill in the art would know that this density range is specifically related to a customer's design requirements and is purely a design choice that can be implemented accordingly.).

Regarding claim 29, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 28. **CROOK** further discloses: wherein **said loop density of said seam is between 72% and 86%** (para [0015] discloses "In accordance with still another feature of the present invention, a density of cross-direction fibers in a region of the seam loops is greater than a density of cross-direction fibers toward a center between the folds." The same explanation provided for claim 28 applies to this claim as well and will not be repeated again to avoid redundancy.).

Regarding claim 30, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 15. **CROOK** further discloses: which further comprises **one or a plurality of layers of nonwoven fibers disposed at least on an upper side of the clothing for contacting the web** (para [0016] discloses

"Further, the insert can include polyurethane, and can be a nonwoven membrane. The insert can also include another flat woven fabric, and the insert, the two terminal ends, and the bottom side surface may be sewn together. To position layers of nonwoven fibers on an upper side of the clothing for contacting the web is purely a design choice and can readily be implemented by one of ordinary skill in the art for routine optimization.).

Regarding claim 31, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 30. **CROOK** further discloses: wherein **at least some of said nonwoven fibers include or are formed of an elastomer or a polyurethane** (para [0010] discloses "According to another aspect of the invention, the base structure can include an enveloped insert composed of, e.g., a formed polyurethane composite nonwoven membrane, such as a SPECTRA membrane manufactured by Voith Fabrics, or another non-flat woven fabric, preferably including an elastomer, or knit material.").

Regarding claim 32, **CROOK** in view of Lee discloses all of the limitations of its base claim 15. **CROOK** further discloses: which further comprises **at least one strip-shaped flow-impeding element provided in a vicinity of said seam, said at least one strip-shaped flow-impeding element being configured to cause a permeability for at least one of air or water in said vicinity of said seam to be substantially identical to a remainder of the clothing** (para [0010] discloses "According to another aspect of the invention, the base structure can include an enveloped insert composed of, e.g., a formed polyurethane composite nonwoven membrane, such as a SPECTRA membrane manufactured by Voith Fabrics, or another non-flat woven fabric, preferably including an elastomer, or knit material. The insert may be smaller than a full width of the base structure as long as the insert provides desired stiffening and/or fiber bonding, e.g., in the form of a low melt fabric or scrim.").

Response to Arguments

6. Applicant's arguments filed on 05/03/2021 have been fully considered but they are not persuasive.

On page 12, para 3, Applicant contends: "*In the rejection of claim 25 the Examiner incorrectly states that Lee discloses monofilaments with a round cross section. Then the Examiner cites Lee's Abstract which says something quite different and correct, by mentioning only flat monofilaments.*" The Examiner respectfully disagrees. Firstly, a minor correction: contrary to the Applicant's response, the Examiner did not cite the Lee's Abstract, but Lee's summary of the invention with respect to previous claim 25, but nevertheless, Lee's reference clearly discloses monofilaments with round cross section. Actually, Lee's patent discusses in much detail monofilaments with round cross section and illustrates that throughout the drawings, which they are too enormous to mention all of them, but two of them are provided herein below as examples:

Lee's patent on Col. 2, lines 4-12 discloses:

"U.S. Pat. No. 4,621,663, assigned to the assignee of the present invention, discloses one attempt to utilize high aspect ratio yarns (on the order of 5:1 and above) to define the surface of a papermakers dryer fabric. As disclosed in that patent, a woven base fabric is provided to support the high aspect ratio surface yarns. The woven base fabric is comprised of conventional round yarns and provides structural support and stability to the fabric disclosed in that patent." (Emphasis added.).

Lee's patent on Col. 7, lines 3-8 discloses:

"A fabric for use as a dryer fabric was woven in accordance with FIGS. 6-8, wherein the CMD yarns 21 were polyester monofilament yarns 0.7 mm in diameter interwoven with MD yarns 22-25 which were flat polyester monofilament yarns having a width of 1.12 mm and a height of 0.2 mm. Accordingly, the aspect ratio of the flat MD yarns was 5.6:1." (Emphasis added.).

Undeniably, Lee's patent clearly teaches round yarns. Therefore, the rejection is maintained.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW M ESLAMI whose telephone number is (571)272-8710. The examiner can normally be reached on M-F 7:30 to 5:30.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Abbas Rashid can be reached on (571)270-7457. 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 https://ppair-my.uspto.gov/pair/PrivatePair. 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.

/MATTHEW M ESLAMI/
Examiner, Art Unit 1748

/Eric Hug/
Primary Examiner, Art Unit 1748

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/980,449	EBERHARDT et al.
	Examiner	Art Unit
	MATTHEW M ESLAMI	1748

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

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

CLAIM		DATE								
Final	Original	02/24/2021	06/16/2021							
	1	-	-							
	2	-	-							
	3	-	-							
	4	-	-							
	5	-	-							
	6	-	-							
	7	-	-							
	8	-	-							
	9	-	-							
	10	-	-							
	11	-	-							
	12	-	-							
	13	-	-							
	14	-	-							
	15	✓	✓							
	16	✓	✓							
	17	✓	✓							
	18	✓	✓							
	19	✓	✓							
	20	✓	✓							
	21	✓	✓							
	22	✓	✓							
	23	✓	✓							
	24	✓	✓							
	25	✓	-							
	26	✓	✓							
	27	✓	✓							
	28	✓	✓							
	29	✓	✓							
	30	✓	✓							
	31	✓	✓							
	32	✓	✓							

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/980,449	EBERHARDT et al.
	Examiner	Art Unit
	MATTHEW M ESLAMI	1748

CPC - Searched*		
Symbol	**Date**	**Examiner**
D21F7/083	02/22/2021	MME
D21F7/10	02/22/2021	MME
D21F1/0036	02/22/2021	MME
D21F1/0054	02/22/2021	MME

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	**Date**	**Examiner**
PE2E text search	02/22/2021	MME
CPC search	02/22/2021	MME
Assignee search	02/22/2021	MME
Inventor(s) search	02/22/2021	MME
Consulted with Jacob Minskey	02/23/2021	MME
Updated search, please see attached searched history.	06/16/2021	MME

/MATTHEW M ESLAMI/ Examiner, Art Unit 1748	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/980,449	EBERHARDT et al.
	Examiner	Art Unit
	MATTHEW M ESLAMI	1748

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/MATTHEW M ESLAMI/ Examiner, Art Unit 1748	

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	16343	(D21F7/083 OR D21F7/10 OR D21F1/0036 OR D21F1/0054).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/02/20 08:04 PM
L2	10	(US-20090090425-$ | US-20170044718-$ | EP-3196357-$ | EP-0425523-$).DID.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/02/20 08:17 PM
L3	2622	((VOITH ADJ patent) near2 (GMBH)).as.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/02/22 08:26 AM
L4	284	(Eberhardt near2 Robert).in.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/02/22 08:27 AM
L5	30	L3 AND (Eberhardt near2 Robert).in.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/02/22 08:29 AM
L6	341	(cloth$3 OR seam ADJ felt) WITH (multi$3 ADJ layer ADJ laminate)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/02/22 09:37 AM
L9	1705	(cloth$3 OR web OR seam ADJ felt) WITH (multi$3 ADJ layers	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD,	OR	ON	ON	2021/02/22 09:42 AM

		ADJ laminate)	DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L10	143	L9 AND (machine ADJ direction ADJ threads) OR (MD ADJ threads) SAME loop$2	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/02/22 09:47 AM
L11	12	L9 AND (machine ADJ direction ADJ threads) OR (MD ADJ threads) SAME loop$2	(US-PGPUB; USPAT)	OR	ON	ON	2021/02/22 09:48 AM
L12	12	(US-20120909-$ | US-6079454-$ | US-7892402-$ | US-7931051-$ | US-8043477-$ | US-8083898-$ | US-8240342-$).DID.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/02/22 12:55 PM
L17	1883	(cloth$3 OR web OR seam ADJ felt) WITH (multi$3 ADJ layer$2 ADJ laminate)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/02/22 01:16 PM
L18	8	(cloth$3 OR web OR seam ADJ felt) WITH (multi$3 ADJ layer$2 ADJ laminate) SAME loop ADJ diameter	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/02/22 01:18 PM
L20	8	(cloth$3 OR web OR seam ADJ felt) WITH (multi$3 ADJ layer$2 ADJ laminate) SAME (loop ADJ diameter)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/02/22 01:19 PM
L21	8	L9 AND (cloth$3 OR web OR seam ADJ felt) WITH (multi$3 ADJ layer$2 ADJ laminate) SAME (loop ADJ diameter)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2021/02/22 01:20 PM

			IBM_TDB)				
L22	8	(cloth$3 OR web OR seam ADJ felt) WITH (multi$3 ADJ layer$2 near2 laminate) SAME (loop near2 diameter)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/02/22 01:42 PM
L23	8	(cloth$3 OR web OR fabric OR seam ADJ felt) WITH (multi$3 ADJ layer$2 near2 laminate) SAME (loop near2 diameter)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/02/22 01:44 PM
L24	8	(cloth$3 OR web OR fabric OR seam ADJ felt) SAME (multi$3 ADJ layer$2 near2 laminate) SAME (loop near2 diameter)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/02/22 01:44 PM
L25	7115	(cloth$3 OR web OR fabric OR seam ADJ felt) SAME (multi$3 ADJ layer$2 near2 laminate)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/02/22 01:47 PM
L26	3	JP-3346736-B2	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/02/22 02:01 PM
L29	2	US-6189577	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/02/22 02:54 PM
L30	2	"20210017708"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2021/02/22 05:16 PM

			IBM_TDB)				
L35	1306	(cloth$3 OR web OR fabric OR seam ADJ felt) SAME (mono$filament$1 WITH (round OR circul$4) ADJ cross ADJ section$3)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/06/16 06:18 PM
L36	233	(cloth$3 OR web OR fabric OR seam ADJ felt) SAME (mono$filament$1 WITH (round OR circul$4) ADJ cross ADJ section$3)	(US-PGPUB; USPAT)	OR	ON	ON	2021/06/16 06:19 PM
L37	73	((("EBERHARDT") near3 ("ROBERT")) OR (("KLASCHKA") near3 ("SUSANNE"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2021/06/16 06:22 PM
L38	992	((("VOITH") near3 ("PATENT") near3 ("GMBH"))).AS,AANM.	(USPAT)	OR	ON	ON	2021/06/16 06:22 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/980,449	Filing Date 09/14/2020	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	05/03/2021	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 17	Minus	** 20	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 1	Minus	*** 3	= 0		x $480 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/ROLITA M WIMBUSH/
*** 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.	

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.**

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SCORE Placeholder Sheet for IFW Content

Application Number: 16980449 Document Date: 05/03/2021

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Form Revision Date: March 1, 2019

DocCode – SCORE

SCORE Placeholder Sheet for IFW Content

Application Number: 16980449 Document Date: 05/03/2021

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Form Revision Date: March 1, 2019

Practitioner's Docket No.: VP-22858

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	16/980,449	Confirmation No. 1867
Filing Date	:	September 14, 2020	
Applicant	:	Robert Eberhardt, et al.	
Title	:	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB	
TC/AU	:	1748	
Examiner	:	Matthew M. Eslami	
Docket No.	:	VP-22858	
Customer No.	:	24131	

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

A M E N D M E N T

Sir:

Responsive to the Office action dated March 3, 2021, kindly amend the above-identified application as follows:

- **Amendments to the Specification** begin on page 2 of this paper.
- **Amendments to the Claims** are reflected in the listing of claims, which begins on page 4 of this paper.
- **Amendments to the Drawings** begin on page 8 of this paper and include both an attached replacement sheet and an annotated sheet showing changes.
- **Remarks/Arguments** begin on page 9 of this paper.

SPECIFICATION AMENDMENTS

Page 17, lines 6-18, replace the paragraph with the following amended paragraph:

Figure 4 shows a seam loop 42, formed from an MD thread 10. The MD thread 10 is embodied as a round monofilament here. A nonwoven layer 15 is provided on the upper side of the clothing. To determine the LD/MDYD ratio, a circle is inscribed in the seam loop 42. This is the largest circle which can be inserted completely into the seam loop 42. The determination of such circles and their diameters is a familiar geometric practice. In commercially available microscopes, such a measurement is also contained within the functional scope of the operating software. In the clothings according to this invention, the seam loops are also vertical or largely vertical, so that the problem of possible distortion does not occur. After interengaging the seam loops of the two ends, an insertion element or pintle shown with a hatched cross section in a circle is inserted in the loop opening so that the two loop ends can no longer disengage.

Replace the Abstract with the following amended Abstract:

-- A clothing, in particular a seam felt for a machine producing a fibrous material web, in particular a paper, paperboard, tissue or pulp web, includes a base structure including or formed of a two-layer laminate structure formed of one or more flat-woven fabrics. The laminate structure has MD threads forming seam loops at two end sides of the base structure, and the two layers of the laminate structure are connected to one another by the seam

loops. The clothing is made endless by connecting the end sides by a seam. The seam is made by interengaging the seam loops of both end sides and introducing an insertion element. The diameter of the seam loops LD and the diameter of the associated MD threads MDYD have a ratio LD/MDYD of between 2.5 and 4, in particular between 2.7 and 3.6. --

CLAIM AMENDMENTS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-14 (canceled).

Claim 15 (currently amended). A clothing or a seam felt for a machine for producing a fibrous material, paper, board, tissue or pulp web, comprising:

a base structure including ~~or being formed of~~ a two-layer laminate structure formed of one or a plurality of flat-woven fabrics, said base structure having two end sides;

said laminate structure having MD threads being monofilaments with a round cross section forming seam loops at said two end sides of said base structure, said seam loops interconnecting said two layers of said laminate structure, said seam loops having a diameter LD and said associated MD threads having a diameter MDYD;

a seam interconnecting said end sides to make the clothing endless, said seam being formed by interengaging said seam loops of said two end sides and an insertion of an insertion element; and

said diameter LD of said seam loops and said diameter MDYD of said associated MD threads having a ratio LD/MDYD of between 2.5 and 4.

Claim 16 (previously presented). The clothing according to claim 15, wherein said ratio LD/MDYD of said diameter LD of said seam loops and said diameter MDYD of said associated MD threads is between 2.7 and 3.6

Claim 17 (previously presented). The clothing according to claim 15, wherein at least one of said flat-woven fabrics have floats extending over two or a plurality of threads.

Claim 18 (previously presented). The clothing according to claim 15, wherein each of said flat-woven fabrics has a first and a second long-side end, said two-layer laminate structure has at least one joint at which two of said long-side ends are interconnected, and said interconnected long-side ends belong to an identical flat-woven fabric or to different flat-woven fabrics.

Claim 19 (previously presented). The clothing according to claim 18, wherein said two long-side ends are interconnected by a welded connection or a laser transmission welded connection.

Claim 20 (previously presented). The clothing according to claim 18, wherein said at least one joint has an extent in a machine direction of less than 15 mm.

Claim 21 (previously presented). The clothing according to claim 20, wherein said extent of said at least one joint in the machine direction is less than 5 mm.

Claim 22 (previously presented). The clothing according to claim 18, wherein said at least one joint is made by connecting elements or connecting threads being welded to at least one or both of said long-side ends.

Claim 23 (previously presented). The clothing according to claim 22, wherein said connecting elements are connecting threads disposed in a CD direction of the clothing, and at most three connecting threads or at most two connecting threads are provided for a joint.

Claim 24 (previously presented). The clothing according to claim 23, wherein one or a plurality of said connecting threads are woven with MD threads of at least one of said long-side ends.

Claim 25 (canceled).

Claim 26 (previously presented). The clothing according to claim 15, wherein said diameter of said MD threads is between 0.15 mm and 0.7 mm.

Claim 27 (previously presented). The clothing according to claim 26, wherein said diameter of said MD threads is between 0.3 mm and 0.5 mm.

Claim 28 (previously presented). The clothing according to claim 15, wherein said seam has a loop density of between 64% and 90%.

Claim 29 (previously presented). The clothing according to claim 28, wherein said loop density of said seam is between 72% and 86%.

Claim 30 (previously presented). The clothing according to claim 15, which further comprises one or a plurality of layers of nonwoven fibers disposed at least on an upper side of the clothing for contacting the web.

Claim 31 (previously presented). The clothing according to claim 30, wherein at least some of said nonwoven fibers include or are formed of an elastomer or a polyurethane.

Claim 32 (previously presented). The clothing according to claim 15, which further comprises at least one strip-shaped flow-impeding element provided in a vicinity of said seam, said at least one strip-shaped flow-impeding element being configured to cause a permeability for at least one of air or water in said vicinity of said seam to be substantially identical to a remainder of the clothing.

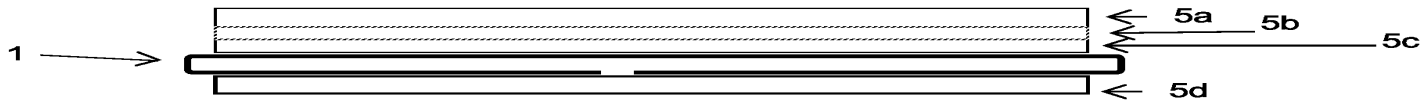
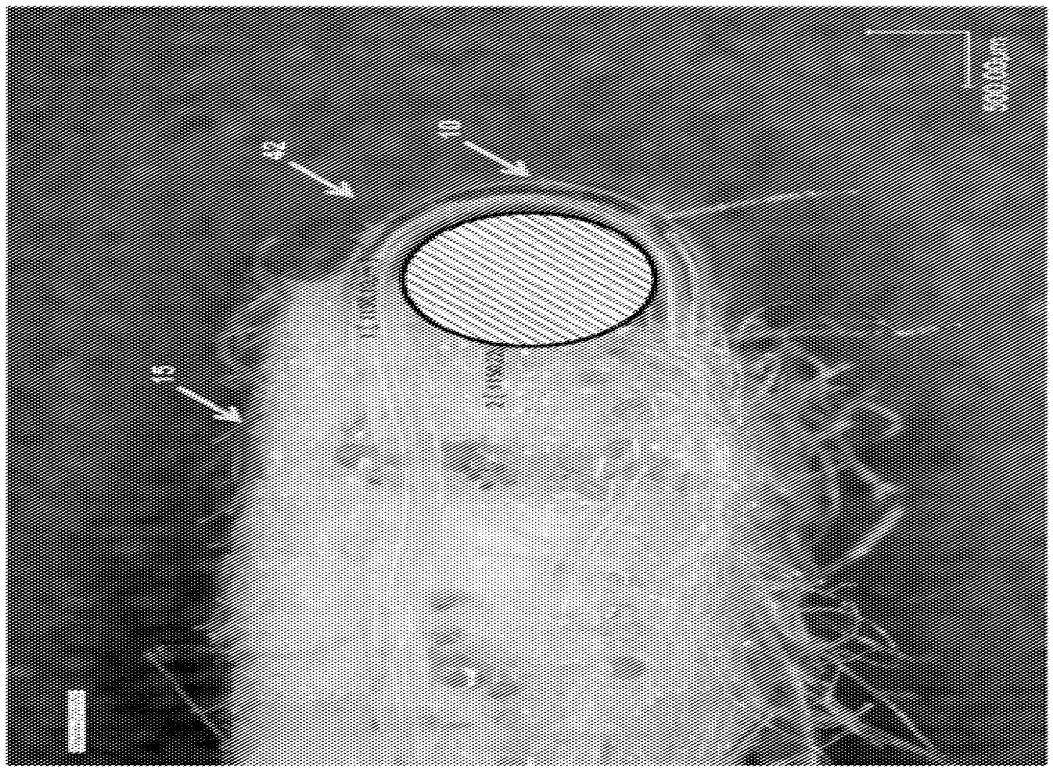


FIG. 3

FIG. 4



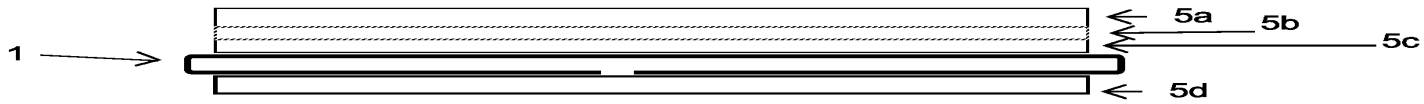
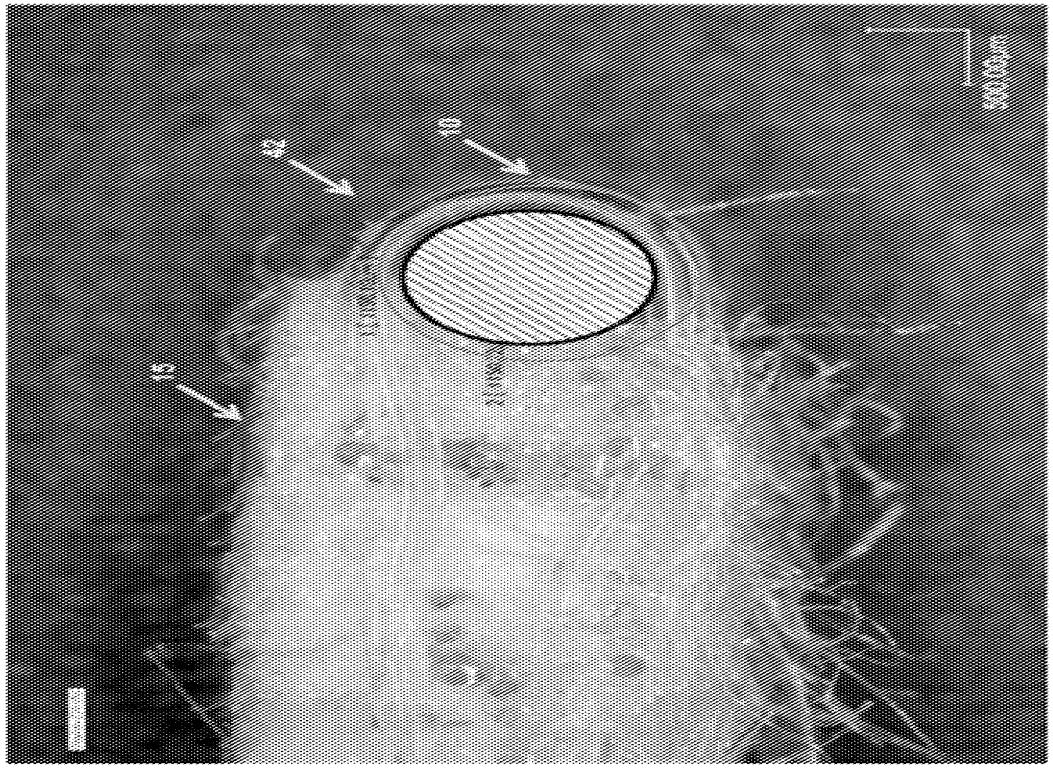


FIG. 3

FIG. 4



Electronic Acknowledgement Receipt	
EFS ID:	42613365
Application Number:	16980449
International Application Number:	
Confirmation Number:	1867
Title of Invention:	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB
First Named Inventor/Applicant Name:	ROBERT EBERHARDT
Customer Number:	24131
Filer:	Laurence Arnold Greenberg
Filer Authorized By:	
Attorney Docket Number:	VP-22858
Receipt Date:	03-MAY-2021
Filing Date:	14-SEP-2020
Time Stamp:	10:01:11
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		VP-22858-am1.pdf	335824 d7ea164dec2a2f06f495df82a48e39779f0615de	yes	13

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Specification	2	3
	Claims	4	7
	Drawings-other than black and white line drawings	8	8
	Applicant Arguments/Remarks Made in an Amendment	9	13

Warnings:					
Information:					
2	Drawings-only black and white line drawings	VP-22858-RPL-Fig4.pdf	1494390 1efc06e562822c2251cd9bb43940193b11e4cb5f	no	1
Warnings:					
Information:					
3	Drawings-only black and white line drawings	VP-22858-ANNO-Fig4.pdf	1494859 180cf5582f2de46910250836d9de2bd5ac0e7212	no	1
Warnings:					
Information:					
		Total Files Size (in bytes):	3325073		

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.

DRAWING AMENDMENTS

The attached sheet 3/4 of drawings includes changes to Fig. 4. This sheet, which includes Figs. 3 and 4, replaces the original sheet including Figs. 3 and 4. In Fig. 4, previously omitted hatching which appears in the PCT priority application was added.

Please approve the drawing changes that are marked in red on the accompanying "Annotated Sheet Showing Changes" of Fig. 4. A formal "Replacement Sheet" of amended Fig. 4 is also enclosed.

Attachments: Replacement Sheet

Annotated Sheet Showing Changes

REMARKS/ARGUMENTS

Reconsideration of the application is requested.

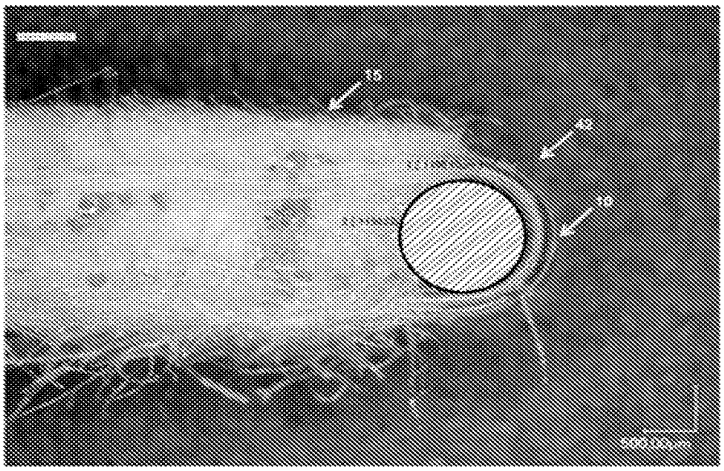
Claims 15-24 and 26-32 are now in the application and are subject to examination. Claim 15 has been amended. No claims have been added herein. Claims 1-14 and 25 have been canceled.

In "Specification" in item 3 on page 2 of the above-identified Office Action, the Examiner objected to the Abstract because of word length. The Abstract in the Preliminary Amendment had only 147 words, even when counting "two-layer" and "LD/MDYD" as two words each. Nevertheless, several words have been deleted to facilitate prosecution of the instant application.

In "Drawings" in item 4 on pages 2-3 of the Office Action the drawings have been objected to for failing to include every feature of the claims under 37 CFR 1.83(a). The insertion element is shown in Fig. 4 as originally filed as a circle. The circle has hatching in the PCT priority application but the hatching was inadvertently deleted when filing the instant application.

A new Fig. 4 as shown below, in which the hatching is restored, is being filed simultaneously herewith. A sentence has also been added to the Specification describing the hatching within the circle in Fig. 4 as the insertion element or pintle. It is noted that the insertion element or pintle is also described on page 4, lines 25-32 and page 7, lines 14-16 of the Specification of the instant application.

Furthermore, a manual regarding the installation of such a pintle is also found at https://www.astenjohnson.com/media/1638/expertip-installing-seamed-press-fabric.pdf making it clear that the term pintle is known in the art.



In "Claim Rejections – 35 USC § 112" in item 5 on pages 3-4 of the Office Action, claims 15-32 have been rejected as being indefinite under 35 U.S.C. § 112(b).

More specifically, the Examiner states that the phrases including and being formed [sic] are mutually exclusive. The Examiner is incorrect and it is noted that such wording is not only definite but very common in U.S. claims. Nevertheless, in order to facilitate prosecution of the instant application, the phrases have been amended.

It is accordingly believed that the claims meet the requirements of 35 U.S.C. § 112(b).

In "Claim Rejections – 35 USC § 103" in item 8 on pages 4-12 of the Office Action, claims 15-32 have been rejected as being obvious over U.S. Patent Application Publication No. 2009/0211722 to Crook, et al. (hereinafter "Crook") in view of U.S. Patent No. 6,189,577 to Lee under 35 U.S.C. § 103.

The rejection of claim 15 has been noted and the claim has been amended in an effort to even more clearly define the invention of the instant application.

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful. Claim 15 calls for, *inter alia*, a clothing or a seam felt for a machine for producing a fibrous material, paper, board, tissue or pulp web, comprising:

> a base structure including a two-layer laminate structure formed of one or a plurality of flat-woven fabrics, said base structure having two end sides;
>
> said laminate structure having MD threads being monofilaments with a round cross section forming seam loops at said two end sides of said base structure, said seam loops interconnecting said two layers of said laminate structure, said seam loops having a diameter LD and said associated MD threads having a diameter MDYD;
>
> a seam interconnecting said end sides to make the clothing endless, said seam being formed by interengaging said seam loops of said two end sides and an insertion of an insertion element; and
>
> said diameter LD of said seam loops and said diameter MDYD of said associated MD threads having a ratio LD/MDYD of between 2.5 and 4.

Support for the changes to claim 15 is found in original claim 25 of the instant application.

As mentioned above, claims 15 and 25 have been rejected as being obvious over Crook in view of Lee. However, it is believed that claim 15, which has been amended to incorporate part of the subject matter of claim 25, is patentable over the prior art, as will be explained below.

The Lee reference teaches the use of flat MD yarns, and –according to the Examiner- it would be obvious to change the aspect ratio of the yarns to arrive at Applicant's claimed relationship.

In the rejection of claim 25 the Examiner incorrectly states that Lee discloses monofilaments with a round cross section. Then the Examiner cites Lee's Abstract which says something quite different and correct, by mentioning only flat monofilaments.

Therefore, in order to overcome the rejection of claim 15, the limitation of claim 25 calling for "monofilaments with a round cross section" has been added to claim 15.

Lee teaches away from using round yarns, and since round filaments have a fixed aspect ratio of 1, changing the aspect ratio to change the LD/MDYD ratio is not possible.

Clearly, neither Crook nor Lee disclose:

> a laminate structure having MD threads being monofilaments with a round cross section forming seam loops at two end sides of a base structure,

as recited in claim 15 of the instant application.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either teach or suggest the limitations of claim 15. Claim 15 is, therefore, believed to be patentable over the art. The dependent claims are believed to be patentable as well because they all are ultimately dependent on claim 15.

In view of the foregoing, reconsideration and allowance of claims 15-24 and 26-32, are solicited. In the event the Examiner should still find any of the claims to be unpatentable, Counsel would appreciate receiving a telephone call so that, if possible, patentable language can be worked out.

If an extension of time is required, petition for extension is herewith made. Any extension fee associated therewith should be charged to the Deposit Account of Lerner Greenberg Stemer LLP, No. 12-1099. Please charge any other fees that might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner Greenberg Stemer LLP, No. 12-1099.

Respectfully submitted,

/Laurence A. Greenberg/
Laurence A. Greenberg
Reg. No. 29308

May 3, 2021
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/980,449	09/14/2020	ROBERT EBERHARDT	VP-22858	1867

24131 7590 03/03/2021

LERNER GREENBERG STEMER LLP
P O BOX 2480
HOLLYWOOD, FL 33022-2480

EXAMINER	
ESLAMI, MATTHEW M	

ART UNIT	PAPER NUMBER
1748	

NOTIFICATION DATE	DELIVERY MODE
03/03/2021	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):

docket@patentusa.com
office@patentusa.com
vrahimis@patentusa.com

Office Action Summary	Application No. 16/980,449	Applicant(s) EBERHARDT et al.	
	Examiner MATTHEW M ESLAMI	Art Unit 1748	AIA (FITF) Status Yes

-- 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 MONTHS 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 14 September 2020.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

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) 15-32 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 15-32 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☑ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 14 September 2020 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).

Priority under 35 U.S.C. § 119

12)☑ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☑ All b)☐ Some** c)☐ None of the:

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) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Priority

2. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119 (a)-(d). The certified copy has been filed in parent Application No. DE10/20181059566, filed on 03/15/2018. Applicant's claim benefit of national stage entry (371) of international PCT/EP2019/055955 filed on 03/11/2019 is also acknowledged. This is a response to the (371) application filed on 2/20/2020. The Preliminary Amendment filed on 09/14/2020 is entered. In the Preliminary Amendment claims 1-14 have been cancelled without prejudice or disclaimer. New claims 15-32 are pending for examination.

Specification

3. Applicant is respectfully reminded that the abstract should be within the range of 50 to 150 words in length. Appropriate correction is required. See MPEP § 608.01(b).

Drawings

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "insertion of an insertion element" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should

include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

5. The following is a quotation of 35 U.S.C. 112(b):

(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 15-32 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor (or for applications subject to pre-AIA 35 U.S.C. 112, the applicant), regards as the invention.

Regarding claim 15 is vague and indefinite since, the phrase "including or being formed" of a two-layer laminate are mutually exclusive. The words "including or comprising or having" are open-ended and should be used unequivocally. Furthermore, in the third paragraph, "a seam interconnecting

said end sides…" should read --- a seam interconnecting said end sides of said base structure---.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

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

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries for establishing a background for determining obviousness under 35 U.S.C. 103 are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 15-32 are rejected under 35 U.S.C. 103 as being unpatentable over **Robert CROOK; et al**. US 20090211722 A1 (**CROOK**) in view of **Henry J. Lee;** USP 6189577 B1 (**Lee)**.

Regarding claim 15, **CROOK** discloses: **A clothing or a seam felt for a machine for producing a fibrous material, paper, board, tissue or pulp web** (Abstract discloses a belt that is fundamentally the same as a clothing or seam felt), comprising: **a base structure** (para [0008]) including or being formed of **a two-layer laminate structure** (para [0050] and [0051]) formed of one or **a plurality of flat-woven fabrics** (Abstract), said **base structure having two end sides** (Abstract discloses "…The belt includes a flat woven material having a top side surface and a bottom side surface and two terminal ends separated in a machine direction."); said laminate structure having **MD threads forming seam loops** (Abstract discloses "…Seam loops are located at the folds…") at said two end sides of said base structure, said seam loops interconnecting said two layers of said laminate structure, said **seam loops having a diameter LD** (para [0004-0005] discloses seam loop and fabric tube, which is inherent and/or self-evident to have a loop diameter for both circular and/or elliptical cross section or configuration and is known to one of ordinary skill in the art.) and said associated **MD threads having a diameter MDYD** (para [0004] discloses "…machine direction (MD) yarns at these ends or folds can then function as the seam loops…". Again any MD threads or yarns would inherently and/or self-evidently have MDYD as known to one of ordinary skill in the art.); **a seam interconnecting said end sides to make the clothing endless** (para [0004] discloses "…The ends or seam loops of the base can be aligned and connected with a pintle to form an endless base for the belt…"), said seam being formed by interengaging said seam loops of said two end sides and **an insertion of an insertion element** (para [0004] discloses "…The ends or seam loops of the base can be aligned and connected with a pintle to form an endless base for the belt…". A pintle can be an insertion element.);

However, **CROOK** does not expressly discloses: and **said diameter LD of said seam loops and said diameter MDYD of said associated MD threads having a ratio LD/MDYD of between 2.5 and 4**.

In the same field of art, **Lee** discloses: and **said diameter LD of said seam loops and said diameter MDYD of said associated MD threads having a ratio LD/MDYD of between 2.5 and 4** (**Lee** on Col. 5, lines 1-14. Examiner views that one of ordinary skill in the art would know that there is an inverse relationship between the aspect ratio of the MD yarns as disclosed by Lee and the MDYD value of the claimed invention. Knowing the aforesaid relationship (increasing MD yarns value, would result in decreasing the MDYD value and vice versa) would direct a worker to manipulate various ratios such as LD/MDYD ratio feature to arrive the intended goal by the claimed invention since the goal of cited reference and the claimed invention (as described in the applicant's disclosure on para [0044]) is to control/reduce/minimize the permeability at the join or joint area of the end sides of the clothing or seam felt or belt. Applicant's disclosure on para [0044] discloses "…Here, it is accepted that the properties of the base structure and of the clothing can differ from the remainder of the clothing in the joint area. Instead, the aim is to keep this different area as small as possible in the MD direction…" Therefore, whether using the concept of aspect ratio of the MD yarns or alternatively, using the ratio of loop diameter of the seam loop over the MD yarn diameter (LD/MDYD), the end result is fundamentally the same since this is an optimizable feature absent of showing the criticality of the ratio of LD/MDYD. The criticality of the LD/MDYD in the claimed invention requires to demonstrate that this ratio provides unexpected results. In sum, the Examiner views that one of ordinary skill in the art would readily be able to calculate this ratio and optimize it accordingly knowing the fact that there is an inverse relationship between the aspect ratio of the MD yarns as disclosed by Lee and the MDYD value of the claimed invention. Thus, regardless of the ranges provided by this ratio LD/MDYD, the teaching of the cited reference **Lee** affirms that this ratio LD/MDYD is an optimizable feature and would be obvious to one of ordinary skill in the art.).

Therefore, it would have been obvious to a person of ordinary skill in the art prior to the effective filing date of the claimed invention to modify the belt or clothing or seam felt of **CROOK** by using the concept of aspect ratio of the MD yarns as taught by **Lee** so as to optimize the ratio of LD/MDYD of the clothing or seam felt of the claimed invention. Similarly, one of ordinary skill in the art, upon reading **Lee** disclosure, would also have been motivated to apply its teaching of utilizing the concept of the aspect ratio of the MD yarns to the ratio of loop diameter of the seam loop over the MD yarn diameter (LD/MDYD) so as to improve the operation of clothing or seam felt for the benefit of the claimed invention.

Regarding claim 16, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 15. **Lee** further discloses: wherein said **ratio LD/MDYD of said diameter LD of said seam loops and said diameter MDYD of said associated MD threads is between 2.7 and 3.6** (**Lee** on Col. 5, lines 1-14. Examiner views that concept of aspect ratio of the MD yarns as disclosed by Lee can equally be applied to the LD/MDYD ratio feature recited by the claimed invention. Applicant's attention is respectfully directed to the full explanation hereinbefore with respect to claim 15).

Regarding claim 17, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 15. **Lee** further discloses: wherein **at least one of said flat-woven fabrics have floats extending over two or a plurality of threads** (Background of the invention, Col. 1, lines 45-49 discloses "…a dryer fabric having three layers of cross machine direction yarns interwoven with a system of flat monofilament machine direction yarns such that floats are created on both the top and bottom surfaces of the fabric. The floats tend to provide a smooth surface for the fabric.").

Regarding claim 18, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 15. **CROOK** further discloses: wherein **each of said flat- woven fabrics has a first and a second long-side end**, said two-layer laminate structure has **at least one joint at which two of said long-side ends are interconnected**, and said interconnected long-side ends belong to **an identical flat- woven fabric or to different flat-woven fabrics** (Fig. 1-4, para [0040] and [0043]).

Regarding claim 19, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 18. **CROOK** further discloses: wherein **said two long-side ends are interconnected by a welded connection or a laser transmission welded connection** (para [0006] discloses "… Further, as an array of parallel yams "reinforced" with needled batt, resins, or other nonwovens can be utilized in forming the described tube for the base, a strong single layer top ply fabric can be provided over the joined area, or needled batt, added resin, thermoplastic "welding", etc. to keep the join in the two fabric ends intact for processing." Examiner views that welded connection or a laser transmission welded connection are common practice and is well known in the manufacturing of clothing or seam felt or belt industry.).

Regarding claim 20, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 18. **CROOK** further discloses: wherein said **at least one joint has an extent in a machine direction of less than 15 mm** (para [0046] discloses "After the base structure of FIG. 3 or FIG. 4 is formed, the seamable ends of the base structure can be joined together to form an endless belt, as illustrated in FIG. 5. Although the cited reference does not disclose exactly that one joint has an extent in a machine direction of less than 15 mm, but one of ordinary skill in the art would know that 15mm extent in MD is purely a design choice and can be manipulated accordingly.).

Regarding claim 21, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 20. **CROOK** further discloses: wherein **said extent of said at least one joint in the machine direction is less than 5 mm** (para [0046]. The same explanation provided for claim 20 applies to this claim as well and will not be repeated again to avoid redundancy.).

Regarding claim 22, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 18. **CROOK** further discloses: wherein said **at least one joint is made by connecting elements or connecting threads being welded to at least one or both of said long-side ends** (Figs. 3 and 4 and para [0006]. As noted previously with respect to the above claims, whether the joint is made by connecting elements or connecting threads being welded is simply a design choice and depends on the specific requirements the manufactures receive from their customer to make the clothing or seam felt or belt and are common practice and is well known in the manufacturing of clothing or seam felt or belt industry.).

Regarding claim 23, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 22. **CROOK** further discloses: wherein **said connecting elements are connecting threads disposed in a CD direction of the clothing, and at most three connecting threads or at most two connecting threads are provided for a joint** (Figs. 3 and 4 and para [0004-0006]. The same explanation provided for claim 22 applies to this claim as well and will not be repeated again to avoid redundancy.).

Regarding claim 24, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 23. **CROOK** further discloses: wherein **one or a plurality of said connecting threads are woven with MD threads of at least one of said long- side ends** (Figs. 3 and 4 and para [0004-0006]. The same

explanation provided for claim 23 applies to this claim as well and will not be repeated again to avoid redundancy.).

Regarding claim 25, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 15. **Lee** further discloses: wherein **said MD threads are monofilaments or monofilaments with a round cross section** (Summary of the invention discloses "The present invention provides a method for weaving a papermakers fabric having a system of flat monofilament machine direction yarns (hereinafter MD yarns) which are stacked to control the permeability of the fabric.").

Regarding claim 26, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 15. **Lee** further discloses: wherein **said diameter of said MD threads is between 0.15 mm and 0.7 mm** (Col. 5, lines 38-44 discloses "In one example, a fabric was woven in accordance with FIGS. 1, 2 and 3, wherein the CMD yarns 11, 12, 13 were polyester monofilament yarns 0.6 mm in diameter interwoven with MD yarns 14-19 which were flat polyester monofilament yarns having a width of 1.12 mm and a height of 0.2 mm." Emphasis is added. Although, Lee discloses CMD yarns with diameter of 0.6 mm and MD yarns with a width 1.12mm and height of 0.2 mm, but one of ordinary skill in the art would know that the MD yarn or thread diameter of Lee can be calculated to be within the range of 0.15 mm to 0.7 mm disclosed by the claimed invention.).

Regarding claim 27, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 26. **Lee** further discloses: wherein **said diameter of said MD threads is between 0.3 mm and 0.5 mm** (Col. 5, lines 38-44. The same explanation provided for claim 26 applies to this claim as well and will not be repeated again to avoid redundancy.).

Regarding claim 28, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 15. **CROOK** further discloses: wherein **said seam has a loop density of between 64% and 90%** (para [0015] discloses "In accordance with still another feature of the present invention, a density of cross-direction fibers in a region of the seam loops is greater than a density of cross-direction fibers toward a center between the folds." Although, CROOK does not specifically disclose the loop density between 64% and 90%, but one of ordinary skill in the art would know that this density range is specifically related to a customer's design requirements and is purely a design choice that can be implemented accordingly.).

Regarding claim 29, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 28. **CROOK** further discloses: wherein **said loop density of said seam is between 72% and 86%** (para [0015] discloses "In accordance with still another feature of the present invention, a density of cross-direction fibers in a region of the seam loops is greater than a density of cross-direction fibers toward a center between the folds." The same explanation provided for claim 28 applies to this claim as well and will not be repeated again to avoid redundancy.).

Regarding claim 30, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 15. **CROOK** further discloses: which further comprises **one or a plurality of layers of nonwoven fibers disposed at least on an upper side of the clothing for contacting the web** (para [0016] discloses "Further, the insert can include polyurethane, and can be a nonwoven membrane. The insert can also include another flat woven fabric, and the insert, the two terminal ends, and the bottom side surface may be sewn together. To position layers of nonwoven fibers on an upper side of the clothing for contacting the web is purely a design choice and can readily be implemented by one of ordinary skill in the art for routine optimization.).

Regarding claim 31, **CROOK** in view of **Lee** discloses all of the limitations of its base claim 30. **CROOK** further discloses: wherein **at least some of said nonwoven fibers include or are formed of an elastomer or a polyurethane** (para [0010] discloses "According to another aspect of the invention, the base structure can include an enveloped insert composed of, e.g., a formed polyurethane composite nonwoven membrane, such as a SPECTRA membrane manufactured by Voith Fabrics, or another non-flat woven fabric, preferably including an elastomer, or knit material.").

Regarding claim 32, **CROOK** in view of Lee discloses all of the limitations of its base claim 15. **CROOK** further discloses: which further comprises **at least one strip-shaped flow-impeding element provided in a vicinity of said seam, said at least one strip-shaped flow-impeding element being configured to cause a permeability for at least one of air or water in said vicinity of said seam to be substantially identical to a remainder of the clothing** (para [0010] discloses "According to another aspect of the invention, the base structure can include an enveloped insert composed of, e.g., a formed polyurethane composite nonwoven membrane, such as a SPECTRA membrane manufactured by Voith Fabrics, or another non-flat woven fabric, preferably including an elastomer, or knit material. The insert may be smaller than a full width of the base structure as long as the insert provides desired stiffening and/or fiber bonding, e.g., in the form of a low melt fabric or scrim.").

Conclusion

1. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW M ESLAMI whose telephone number is (571)272-8710. The examiner can normally be reached on M-F 7:30 to 5:30.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Abbas Rashid can be reached on (571)270-7457. 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 https://ppair-my.uspto.gov/pair/PrivatePair. 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.

/MATTHEW M ESLAMI/
Examiner, Art Unit 1748

/Eric Hug/
Primary Examiner, Art Unit 1748

Notice of References Cited	Application/Control No. 16/980,449	Applicant(s)/Patent Under Reexamination EBERHARDT et al.	
	Examiner MATTHEW M ESLAMI	Art Unit 1748	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-6189577-B1	02-2001	Lee; Henry J.	D21F1/0036	139/383A
*	B	US-20090211722-A1	08-2009	CROOK; Robert	D21F7/10	162/358.4
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

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

NON-PATENT DOCUMENTS

*		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.	Applicant(s)/Patent Under Reexamination
	16/980,449	EBERHARDT et al.
	Examiner	Art Unit
	MATTHEW M ESLAMI	1748

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

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

CLAIM		DATE								
Final	Original	02/24/2021								
	1	-								
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	29	✓								
	30	✓								
	31	✓								
	32	✓								

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/980,449	EBERHARDT et al.
	Examiner	Art Unit
	MATTHEW M ESLAMI	1748

CPC - Searched*		
Symbol	**Date**	**Examiner**
D21F7/083	02/22/2021	MME
D21F7/10	02/22/2021	MME
D21F1/0036	02/22/2021	MME
D21F1/0054	02/22/2021	MME

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	**Date**	**Examiner**
PE2E text search	02/22/2021	MME
CPC search	02/22/2021	MME
Assignee search	02/22/2021	MME
Inventor(s) search	02/22/2021	MME
Consulted with Jacob Minskey	02/23/2021	MME

/MATTHEW M ESLAMI/ Examiner, Art Unit 1748	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/980,449	EBERHARDT et al.
	Examiner	Art Unit
	MATTHEW M ESLAMI	1748

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/MATTHEW M ESLAMI/ Examiner, Art Unit 1748	

Bibliographic Data

Application No: 16/980,449

Foreign Priority claimed: ◉ Yes ○ No

35 USC 119 (a-d) conditions met: ☑ Yes ☐ No ☐ Met After Allowance

Verified and Acknowledged: /MATTHEW M ESLAMI/ Examiner's Signature | Initials

Title: CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
09/14/2020	162	1748	VP-22858
RULE			

APPLICANTS

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SUSANNE KLASCHKA, KOELN, GERMANY

CONTINUING DATA

This application is a 371 of PCT/EP2019/055955 03/11/2019

FOREIGN APPLICATIONS

GERMANY DE10 2018 105 956.6 03/15/2018

IF REQUIRED, FOREIGN LICENSE GRANTED**

10/08/2020

STATE OR COUNTRY

GERMANY

ADDRESS

LERNER GREENBERG STEMER LLP
P O BOX 2480
HOLLYWOOD, FL 33022-2480
UNITED STATES

FILING FEE RECEIVED

$1,580

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	16343	(D21F7/083 OR D21F7/10 OR D21F1/0036 OR D21F1/0054).cpc.	US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/02/20 08:04 PM
L2	10	(US-20090090425-$ | US-20170044718-$ | EP-3196357-$ | EP-0425523-$).DID.	US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/02/20 08:17 PM
L3	2622	((VOITH ADJ patent) near2 (GMBH)).as.	US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/02/22 08:26 AM
L4	284	(Eberhardt near2 Robert).in.	US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/02/22 08:27 AM
L5	30	L3 AND (Eberhardt near2 Robert).in.	US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/02/22 08:29 AM
L6	341	(cloth$3 OR seam ADJ felt) WITH (multi$3 ADJ layer ADJ laminate)	US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/02/22 09:37 AM
L9	1705	(cloth$3 OR web OR seam ADJ felt) WITH	US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU,	OR	ON	ON	2021/02/22 09:42 AM

		(multi$3 ADJ layers ADJ laminate)	CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB				
L10	143	L9 AND (machine ADJ direction ADJ threads) OR (MD ADJ threads) SAME loop$2	US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/02/22 09:47 AM
L11	12	L9 AND (machine ADJ direction ADJ threads) OR (MD ADJ threads) SAME loop$2	US-PGPUB; USPAT	OR	ON	ON	2021/02/22 09:48 AM
L12	12	(US-20120909-$ | US-6079454-$ | US-7892402-$ | US-7931051-$ | US-8043477-$ | US-8083898-$ | US-8240342-$).DID.	US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/02/22 12:55 PM
L17	1883	(cloth$3 OR web OR seam ADJ felt) WITH (multi$3 ADJ layer$2 ADJ laminate)	US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/02/22 01:16 PM
L18	8	(cloth$3 OR web OR seam ADJ felt) WITH (multi$3 ADJ layer$2 ADJ laminate) SAME loop ADJ diameter	US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/02/22 01:18 PM
L20	8	(cloth$3 OR web OR seam ADJ felt) WITH (multi$3 ADJ layer$2 ADJ laminate) SAME (loop ADJ diameter)	US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/02/22 01:19 PM
L21	8	L9 AND (cloth$3 OR web OR seam ADJ felt) WITH (multi$3 ADJ layer$2 ADJ laminate) SAME (loop ADJ diameter)	US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2021/02/22 01:20 PM

			IBM_TDB				
L22	8	(cloth$3 OR web OR seam ADJ felt) WITH (multi$3 ADJ layer$2 near2 laminate) SAME (loop near2 diameter)	US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/02/22 01:42 PM
L23	8	(cloth$3 OR web OR fabric OR seam ADJ felt) WITH (multi$3 ADJ layer$2 near2 laminate) SAME (loop near2 diameter)	US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/02/22 01:44 PM
L24	8	(cloth$3 OR web OR fabric OR seam ADJ felt) SAME (multi$3 ADJ layer$2 near2 laminate) SAME (loop near2 diameter)	US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/02/22 01:44 PM
L25	7115	(cloth$3 OR web OR fabric OR seam ADJ felt) SAME (multi$3 ADJ layer$2 near2 laminate)	US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/02/22 01:47 PM
L26	3	JP-3346736-B2	US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/02/22 02:01 PM
L29	2	US-6189577	US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/02/22 02:54 PM
L30	2	"20210017708"	US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/02/22 05:16 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

Receipt date: 09/14/2020

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	16/980,449
Filing Date	9/14/2020
First Named Inventor	Robert Eberhardt et al.
Art Unit	1748
Examiner Name	Matthew M. Eslami
Attorney Docket Number	VP-22858

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/M.M.E./	1	20170044718	A1	2017-02-16	Wich	
/M.M.E./	2	20090090425	A1	2009-04-09	Hawes et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
/M.M.E./	1	0425523	EP	B1	1995-03-15	Sudre	Published in English	
/M.M.E./	2	3196357	EP	A1	2017-07-26	Ogiwara	Published in English	

EFS Web 2.1.17

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.M.E./

Receipt date: 09/14/2020

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	
	First Named Inventor	Robert Eberhardt et al.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	VP-22858

If you wish to add additional Foreign Patent Document citation information please click the Add button [Add]

NON-PATENT LITERATURE DOCUMENTS [Remove]

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
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If you wish to add additional non-patent literature document citation information please click the Add button [Add]

EXAMINER SIGNATURE

Examiner Signature	/MATTHEW M ESLAMI/	Date Considered	02/22/2021

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.M.E./

Receipt date: 09/14/2020

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	
	First Named Inventor	Robert Eberhardt et al.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	VP-22858

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Laurence A. Greenberg/	Date (YYYY-MM-DD)	2020-09-10
Name/Print	Laurence A. Greenberg	Registration Number	29308

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/980,449	09/14/2020	ROBERT EBERHARDT	VP-22858

CONFIRMATION NO. 1867

24131
LERNER GREENBERG STEMER LLP
P O BOX 2480
HOLLYWOOD, FL 33022-2480

PUBLICATION NOTICE

OC000000122786102

Title:CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB

Publication No.US-2021-0017708-A1
Publication Date:01/21/2021

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 Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, 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 https://portal.uspto.gov/pair/PublicPair. 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 Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

MULTIPLE DEPENDENT CLAIM FEE CALCULATION SHEET Substitute for Form PTO-1360 (For use with Form PTO/SB/06)	Application Number 16980449	Filing Date
	Applicant(s) ROBERT EBERHARDT	
	* May be used for additional claims or amendments	

CLAIMS	AS FILED		AFTER FIRST AMENDMENT		AFTER SECOND AMENDMENT	
	Indep	Depend	Indep	Depend	Indep	Depend
1	1					
2		1				
3		1				
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Total Indep	1		1		0	
Total Depend	14	↵	17	↵	0	↵
Total Claims	15		18		0	

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 16/980,449

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	320
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	540
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	800
TOTAL CLAIMS (37 CFR 1.16(i))	18 minus 20 =	*			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*				x 480 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1660

APPLICATION AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							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 found in the appropriate box in column 1.

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/980,449	09/14/2020		1580	VP-22858	18	1

CONFIRMATION NO. 1867

24131
LERNER GREENBERG STEMER LLP
P O BOX 2480
HOLLYWOOD, FL 33022-2480

FILING RECEIPT

OC000000120543152

Date Mailed: 10/13/2020

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

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Inventor(s)

ROBERT EBERHARDT, ELLWANGEN, GERMANY;
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Applicant(s)

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Power of Attorney: The patent practitioners associated with Customer Number 24131

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CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB

Preliminary Class

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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371 ACCEPTANCE LETTER

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NOTICE OF ACCEPTANCE OF APPLICATION UNDER 35 U.S.C 371 AND 37 CFR 1.495

The applicant is hereby advised that the United States Patent and Trademark Office, in its capacity as a Designated / Elected Office (37 CFR 1.495), has ACCEPTED the above identified international application for national patentability examination in the United States Patent and Trademark Office.

The United States Application Number assigned to the application is shown above. A Filing Receipt will be issued for the present application in due course. **THE DATE APPEARING ON THE FILING RECEIPT AS THE "FILING DATE or 371(c) DATE" IS THE DATE ON WHICH THE LAST OF THE 35 U.S.C. 371 (c)(1) and (c)(2) REQUIREMENTS HAS BEEN RECEIVED IN THE OFFICE. THIS DATE IS SHOWN BELOW.** The filing date of the above identified application is the international filing date of the international application (Article 11(3) and 35 U.S.C. 363)

09/14/2020
DATE OF RECEIPT OF 35 U.S.C.
371(c)(1) and (c)(2) REQUIREMENTS

The following items have been received:

- Copy of the International Application filed on 09/14/2020
- English Translation of the IA filed on 09/14/2020
- Copy of the International Search Report filed on 09/14/2020
- Preliminary Amendments filed on 09/14/2020
- Information Disclosure Statements filed on 09/14/2020
- Inventor's Oath or Declaration filed on 09/14/2020
- Request for Immediate Examination filed on 09/14/2020
- U.S. Basic National Fees filed on 09/14/2020
- Authorize Access to Search Results filed on 09/14/2020
- Priority Documents filed on 09/14/2020
- Power of Attorney filed on 09/14/2020
- Authorization to Permit Access filed on 09/14/2020
- Application Data Sheet (37 CFR 1.76) filed on 09/14/2020

Applicant is reminded that any communications to the United States Patent and Trademark Office must be mailed to the address given in the heading and include the U.S. application no. shown above (37 CFR 1.5)

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FORM PCT/DO/EO/903 (371 Acceptance Notice)

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

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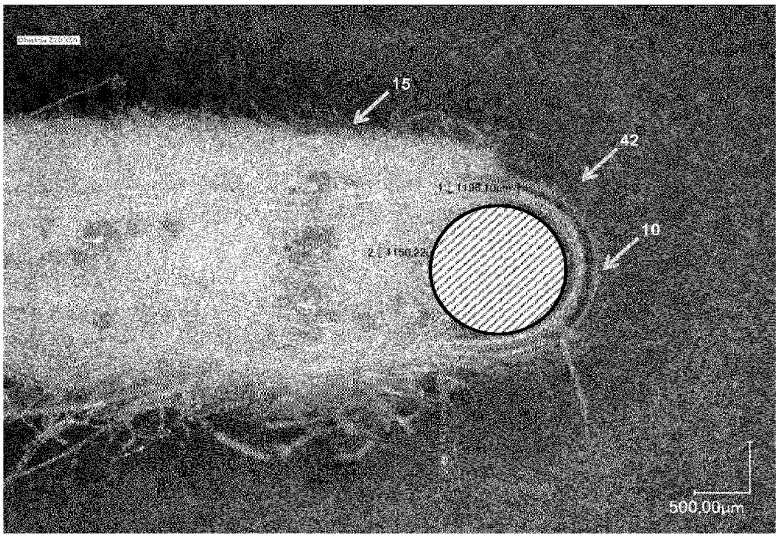
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(54) Title: COVERING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB

(54) Bezeichnung: BESPANNUNG FÜR EINE MASCHINE ZUR HERSTELLUNG EINER FASERSTOFFBAHN

Figur 4



(57) Abstract: The invention relates to a covering, in particular a seam felt for a machine for producing a fibrous material web, in particular a paper, paperboard, tissue or pulp stock web, comprising a basic structure including or consisting of a two-layer laminate structure formed of one or more flat-woven elements, wherein the laminate structure has MD threads which form seam loops at the two end sides of the basic structure, and the two layers of the laminate structure are connected to one another via the seam loops, and wherein the covering is made continuous by connecting the end sides thereof by means of a seam, and this seam is executed by engaging the seam loops of both end sides and introducing an insertion element. According to the invention, the diameter of the seam loops (LD) and the diameter of the associated MD threads (MDYD) have a ratio (LD/MDYD) of between 2.5 and 4, in particular between 2.7 and 3.6.

[Fortsetzung auf der nächsten Seite]

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GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), eurasisches (AM, AZ, BY, KG, KZ, RU, TJ, TM), europäisches (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Veröffentlicht:

— *mit internationalem Recherchenbericht (Artikel 21 Absatz 3)*

(57) Zusammenfassung: Bespannung, insbesondere Nahtfilz für eine Maschine zur Herstellung einer Faserstoffbahn, insbesondere einer Papier~, Karton~, Tissue~ oder Zellstoffbahn, umfassend eine Grundstruktur, die eine zweilagige Laminatstruktur aus einem oder mehreren flachgewebte Elemente umfasst oder daraus besteht, wobei die Laminatstruktur MD-Fäden aufweist, welche an den beiden stirnseitigen Enden der Grundstruktur Nahtschlaufen ausbilden und die beiden Lagen der Laminatstruktur über die Nahtschlaufen miteinander verbunden sind, und wobei die Bespannung durch Verbinden ihrer stirnseitigen Enden mittels einer Naht endlos gemacht ist, und diese Naht durch Ineinandergreifen der Nahtschlaufen beider stirnseitiger Enden und das Einführen eines Steckelements ausgeführt ist. Erfindungsgemäß ist vorgesehen, dass der Durchmesser der Nahtschlaufen (LD) und der Durchmesser der zugehörigen MD-Fäden (MDYD) ein Verhältnis LD/MDYD zwischen 2.5 und 4, insbesondere zwischen 2.7 und 3.6 aufweisen.

BESPANNUNG FÜR EINE MASCHINE ZUR HERSTELLUNG EINER FASERSTOFFBAHN

Die Erfindung betrifft eine Bespannung, insbesondere Nahtfilz für eine Maschine zur Herstellung einer Faserstoffbahn gemäß dem Oberbegriff des Anspruchs 1.

Bespannungen, die in Papiermaschinen zum Einsatz kommen, bestehen üblicherweise aus endlosen Bandschlaufen. Diese Bandschlaufen werden im Betrieb der Maschine kontinuierlich über eine Vielzahl von Stütz- und Leitelementen im Kreis geführt und stehen dabei stets unter eine Zugspannung. Zudem sind sie Belastungen durch Pressen, Saugelementen und ähnlichem ausgesetzt.
Um diesen Belastungen dauerhaft standhalten zu können, weisen solche Bespannungen häufig eine gewebte Grundstruktur auf.

Es sind verschiedene Möglichkeiten bekannt, eine gewebte Grundstruktur in der für die Bespannung benötigten Endloskonfiguration herzustellen. Am häufigsten werden solche Strukturen rund-gewebt. Dabei wird direkt auf dem Webstuhl eine schlauchförmige Gewebestruktur erzeugt. Beim Einsatz in einer Papiermaschine wird dieser Schlauch gedreht, so dass sie Schussfäden des Webstuhls zu dem Maschinenrichtungs-Fäden (MD-Fäden) der Bespannung werden.
Diese Art des Webens ist jedoch sehr zeitaufwändig. Zudem muss beim Weben bereits die benötigte Länge der Bespannung exakt bekannt sein. Ein Weben ‚auf Vorrat' ist nicht möglich.

Um eine effizientere Art der Herstellung zu ermöglichen, schlägt die EP 0 425 523 die Verwendung von flach gewebten Bahnen vor. Diese werden in der doppelten Länge der benötigten Bespannung bereitgestellt. Durch Umfalten und Aufeinander-ablegen der längsseitigen Enden wird eine zweilagige Laminatstruktur erzeugt. Durch Entfernen von CD-Fäden an den Faltstellen werden Nahtschlaufen erzeugt. Durch Ineinandergreifen der Nahtschlaufen beider stirnseitiger Enden und das Einführen eines Steckelements kann diese Grundstruktur endlos gemacht werden. Im Gegensatz zu den rundgewebten Strukturen sind hier die Kettfäden des Gewebes die MD-Fäden der Bespannung. Auf diese Weise lassen sich Nahtbespannungen sehr

effizient herstellen. Insbesondere kann ein Flachgewebe bereits auf Vorrat produziert und als Rolle gelagert werden, wenn die Dimensionen der fertigen Bespannung noch nicht bekannt sind. Zur Fertigung der Bespannung muss dann nur die benötigte Länge von der Rolle abgewickelt und in der Breite gegebenenfalls auf die Bespannungsbreite gekürzt werden.

Diese Art der Herstellung bringt jedoch auch Nachteile mit sich.
Zum einen liegen diese im Bereich der Naht. .An der Nahtstelle unterscheiden sich die Eigenschaften von denen des restlichen Teils der Bespannung. Häufig ist hierbeispielsweise die Permeabilität für Wasser und Luft höher, als im Rest der Bespannung. Dadurch kann es zu einer Qualitätseinbuße durch Markierungen im Papier kommen.
Eine weitere kritische Stelle ist der sogenannte „Join“. Durch das Umfalten kommen die beiden längsseitigen Enden auf einer Seite der Grundstruktur zu liegen. Sie können dabei auf Stoß, überlappend oder mit Abstand angeordnet sein. Auch an dieser Stelle unterscheiden sich die Eigenschaften der Grundstruktur vom übrigen Bereich, wodurch Markierungen im Papier entstehen können.

Es ist daher die Aufgabe der vorliegenden Erfindung, eine Bespannung anzugeben, die schnell und ökonomisch herstellbar sowie einsetzbar ist, und gleichzeitig die aus dem Stand der Technik bekannten Qualitätsmängel überwindet.

Diese Aufgabe wird vollständig gelöst durch eine Bespannung nach dem Kennzeichen des Anspruchs 1.

Zum besseren Verständnis der Erfindung seien noch einige Erläuterungen und Definitionen vorangestellt, welche im Rahmen dieser Anwendung verwendet werden.

Unter MD-Fäden sollen Fäden verstanden werden, die in Längsrichtung der Grundstruktur, bzw. der Bespannung orientiert sind, oder von dieser um maximal 10° abweichen. (MD – machine direction)

Unter CD-Fäden sollen Fäden verstanden sind, die in Querrichtung der Grundstruktur bzw. der Bespannung orientiert sind, oder von dieser um maximal 10° abweichen. (CD-cross direction).

Im Rahmen dieser Anmeldung wird der Begriff ‚Durchmesser eines Fadens' verwendet. Bei runden Fäden ist dieser Begriff wohldefiniert.
Für Monofilamente, die von der runden Form abweichen, oder auch für aus mehreren Monofilamenten gezwirnte Fäden soll unter dem Durchmesser des Fadens der Durchmesser desjenigen Kreises verstanden werden, welcher dieselbe Fläche aufweist, wie der Querschnitt des Fadens, bzw. wie die Summe der Querschnitte der einzelnen Monofilamente.
Für ein Monofilament mit quadratischem Querschnitt und 1 mm Kantenläge ergäbe sich somit der folgende Durchmesser D:

$$A = 1[mm^2] = \pi r^2 \Rightarrow r = \sqrt{\frac{1}{\pi}}\,[mm] \Rightarrow D = 2r \approx 1{,}12\,[mm]$$

Zur Bestimmung des Durchmessers einer Nahtschlaufe wird der größte Kreis ermittelt, welcher sich vollständig in die Nahtschlaufe einfügen lässt. Der Durchmesser dieses Kreises wird dann als der Durchmesser der Nahtschlaufe betrachtet.

Es wird eine Bespannung, insbesondere ein Nahtfilz für eine Maschine zur Herstellung einer Faserstoffbahn, insbesondere einer Papier~, Karton~, Tissue~ oder Zellstoffbahn vorgeschlagen. Die Bespannung umfasst eine Grundstruktur, die eine zweilagige Laminatstruktur aus einem oder mehreren flachgewebte Elemente umfasst oder daraus besteht.

Dabei weist die Laminatstruktur MD-Fäden auf, welche an den beiden stirnseitigen Enden der Grundstruktur Nahtschlaufen ausbilden und über die die beiden Lagen der Laminatstruktur miteinander verbunden sind. Die Bespannung ist durch Verbinden ihrer stirnseitigen Enden mittels einer Naht endlos gemacht. Diese Naht ist durch das

Ineinandergreifen der Nahtschlaufen beider stirnseitiger Enden und das Einführen eines Steckelements gebildet.

Erfindungsgemäß ist dabei vorgesehen, dass der Durchmesser der Nahtschlaufen (LD-loop diameter) und der Durchmesser der zugehörigen MD-Fäden (MDYD-MD yarn diameter) ein Verhältnis LD/MDYD zwischen 2.5 und 4, insbesondere zwischen 2.7 und 3.6 aufweisen.

Versuche der Anmelderin haben ergeben, dass bei den erfindungsgemäßen LD/MDYD-Verhältnissen die entstehende Naht in vielerlei Hinsicht optimal ist.
Zum einen weist sie eine sehr hohe Festigkeit auf, ohne die ein erfolgreicher Einsatz z.B. als Nahtfilz nicht möglich ist.
Zudem ist das Schließen der Naht sehr einfach möglich. Die Naht einer Nahtbespannung wird üblicherweise in der Papiermaschine selbst durch Einziehen eines Steckelements, auch Pintle oder Steckdraht genannt, geschlossen. Dieses Einziehen geschieht händisch, und kann besonders bei breiten Maschinen ein langwieriger Prozess sein. Dadurch, dass der Schlaufendurchmesser im Verhältnis zum MD-Faden Durchmesser nicht zu klein wird, wird das Einziehen des Steckdrahtes erleichtert. Zu diesem ergonomischen Vorteil verkürzt sich die Zeit für das Einziehen einer neuen Bespannung, was für den Betreiber der Anlage ökonomische Vorteile bietet.
Jedoch darf der Durchmesser, bzw. das LD/MDYD Verhältnis auch nicht zu groß werden. Zu große Schlaufen können einerseits zu mechanischen Markierungen im Papier führen, indem sich die Biegungen der Schlaufe z.B. beim Durchlaufen eines Pressnips in das Papier einprägen. Andererseits bedeuten große Schlaufen auch, dass der Nahtbereich selbst vergleichsweise groß wird. Da sich dieser Nahtbereich strukturell vom Rest der Bespannung unterscheidet, und insbesondere auch eine veränderte Permeabilität für Wasser und/oder Luft aufweist, besteht im Nahtbereich die Gefahr von hydraulischen Markierungen im Papier aufgrund einer unterschiedlichen Entwässerung. Aus diesem Grund ist es wünschenswert, den Naht Bereich so klein wie möglich zu halten.

Der erfindungsgemäße Bereich LD/MDYD zwischen 2.5 und 4, insbesondere zwischen 2.7 und 3.6 hat sich hier als der optimale Kompromiss erwiesen.
Insbesondere hat die Anmelderin erkannt, dass als charakterisierende Größe nicht der absolute Schlaufendurchmesser (in mm), sondern der Relativwert LD/MDYD herangezogen werden muss.

Vorteilhafte Ausführungen der Erfindung sind in den abhängigen Ansprüchen beschrieben.

Es kann vorgesehen sein, dass die Grundstruktur neben der zweilagigen Laminatstruktur noch weitere Komponenten umfasst. So kann z.B. noch eine weitere Gewebelage und/der eine Gelegelage und/oder eine Vlieslage vorgesehen sein. Die zusätzlichen Komponenten können außen auf der zweilagigen Laminatstruktur angeordnet sein. Alternativ oder zusätzlich kann eine zusätzliche Komponente auch zwischen den beiden Lagern der zweilagigen Laminatstruktur angeordnet sein.

Die beiden Lagen der zweilagigen Laminatstruktur können aus einem einzigen flachgewebten Element gebildet sein. Dieses Flachgewebe weist – zumindest in etwa -die doppelte Länge der späteren Bespannung auf. Durch Falten und Ablegen der beiden Enden des Flachgewebes auf den Mittelteil des Flachgewebes entsteht eine doppellagige Struktur wobei an sich den Faltstellen die Nahtschlaufen ausbilden. Die längsseitigen Enden des flachgewebten Elementes können dabei in einem sogenannten ‚Join'-Bereich auf Stoß, überlappend oder mit Abstand angeordnet sein. Der Überlapp bzw. der Abstand beträgt dabei vorteilhafterweise weniger als 5cm, insbesondere weniger als 2 cm.

Alternativ können die beiden Lagen aus mehreren flachgewebten Elementen gebildet sein. Dabei können alle flachgewebten Elemente dieselbe Länge aufweisen. Es kann jedoch auch vorgesehen sein, dass diese flachgewebten Elemente unterschiedliche Längen aufweisen. Auch in diesen Ausführungen sind die Nahtschlaufen durch umschlagen von einem oder zwei flachgewebten Elementen gebildet. Auf diese

Weise sind die beiden Lagen der Laminatstruktur auch hier durch die Nahtschlaufen miteinander verbunden.
Umfasst die Grundstruktur mehrere flachgewebte Elemente so entstehen auch mehrere Join-Bereiche, für die dasselbe gilt, wie oben für den Fall eines Join-Bereiches beschrieben.
Bei der Verwendung von mehreren flachgewebten Elementen besteht die Möglichkeit, dass alle Elemente aus demselben Gewebe bestehen. Alternativ kann aber auch vorgesehen sein, dass sich die Elemente in einem oder mehreren Merkmalen unterscheiden. Dabei kann es sich bei den Merkmalen um das Webmuster handeln, das Material, den Durchmesser bzw. den Aufbau der MD-, bzw. CD-Fäden oder andere Kennzeichen des Gewebes, die dem Fachmann bekannt sind.

Eines oder alle der flachgewebten Elemente können beispielsweise als ‚plain weave', also mittels einer Leinwandbindung realisiert sein. Diese Art des Gewebes ist sehr einfach und schnell herzustellen, was ökonomisch vorteilhaft ist.

Ein bekannter Effekt bei zweilagigen Gewebestrukturen ist jedoch der Moiré Effekt. Dieser tritt bei zweilagigen Leinwandgeweben verstärkt auf. Zur Reduzierung dieses Effektes, und damit auch zur Reduzierung der Gefahr von Markierungen im Papier, die durch diesen Effekt ausgelöst werden, kann es vorteilhaft sein, wenn zumindest eines oder alle der flachgewebten Elemente kein Leinwandgewebe sind.
Insbesondere kann es hierfür vorteilhaft sein, wenn eines oder alle der flachgewebten Elemente Flottierungen aufweist, die sich über zwei oder mehrere Fäden erstrecken. Somit kann die Stärke des Moiré-Effekts reduziert werden. Trotzdem bleibt der Vorteil der einfachen Erzeugung der Nahtschlaufen erhalten.

Als Steckelement können alle aus dem Stand der Technik bekannten Steckelemente verwendet werden. Insbesondere können Steckdrähte aus einem oder mehreren Filamenten eingesetzt werden.

Die beiden Lagen der zweilagige Laminatstruktur können vorteilhafterweise durch Vernähen oder andere geeignete Techniken miteinander verbunden werden. Bevorzugt können solche Verbindungen in der Nähe der Nahtschlaufen und/oder in der Nähe der Join-Bereiche vorgesehen sein.

In bevorzugten Ausführungen kann vorgesehen sein, dass jedes der flachgewebten Elemente ein erstes und ein zweites längsseitiges Ende aufweist, und die zweilagige Laminatstruktur zumindest eine Fügestelle aufweist, an der zwei längsseitige Enden miteinander verbunden sind. In dieser Ausführung ist also zumindest einer der Join-Bereiche als Fügestelle ausgeführt. Dabei können die gefügten längsseitigen Enden, wie oben beschrieben zu demselben flachgewebten Element oder zu verschiedenen flachgewebten Elementen gehören können.

Die Verbindung an der bzw. den Fügestellen kann durch eine Vielzahl von bekannten Verfahren erfolgen. Insbesondere kann die Verbindung an der zumindest einen Fügestelle durch eine Klebeverbindung und/oder eine Schweißverbindung realisiert ist. So sind beispielsweise mittels Ultraschall oder mittels eines Lasers geschweißte Fügestellen möglich. Besonders vorteilhaft ist das Verschweißen mittels eines NIR-Lasers im Transmissionsschweißverfahren. Das Lasertransmissionssschweißen ist insbesondere deshalb vorteilhaft, da die üblichen Polyamidgarne des Gewebes für Laserlicht in einem weiten Frequenzbereich transparent sind, und sehr einfach durch unter Verwendung absorbierender, z.B. schwarzer Verbindungsfäden verschweißt werden können. Es ist auch möglich, die Fügestelle in Form einer Webnaht auszuführen. Solche Webnähte werden beispielsweise verwendet, um gewebte Formiersiebe endlos zu machen. Webnähte sind zwar häufig aufwändiger herzustellen, als Klebe- oder Schweißverbindungen, jedoch kann eine derartige Fügestelle eine sehr hohe Festigkeit aufweisen .

Ein Verbinden der längsseitigen Enden durch eine Fügestelle bietet eine Reihe von Vorteilen. Zum einen wird die Zugfestigkeit der zweilagigen Laminatstruktur dadurch erhöht. Die Fügestelle dient zudem auch dazu, die losen Enden der MD Fäden an den längsseitigen Enden besser zu fixieren. Ohne eine solche Fixierung kann es bei

manchen Anwendungen dazu kommen, dass sich diese Enden während des Betriebs der Bespannung lösen, und durch eventuell vorhandene Vlieslagen etc. hindurch an die Oberfläche der Bespannung transportiert werden. Dort können diese losen Enden zu Beschädigungen und Markierungen in der produzierten Faserstoffbahn führen. Durch die Fixierung der losen Enden durch die Fügestelle kann ein Herausarbeiten dieser Enden ganz oder weitgehend vermieden werden.

Bevorzugt kann vorgesehen sein, dass die Ausdehnung der zumindest einen Fügestelle in Maschinenrichtung (MD) weniger als 15mm, weniger als 10mm, insbesondere weniger als 5mm beträgt. Da an den Join- bzw. Fügestellen auch wieder die Gefahr unterschiedlicher Entwässerungsverhältnisse verglichen mit dem Rest der Bespannung besteht, ist eine geringe Ausdehnung dieser Bereiche vorteilhaft zur Reduzierung der Markierungsneigung.
Während bisher im Stand der Technik versucht wurde, den Join- bzw.- Fügebereich dem Rest der Bespannung in wesentlichen Eigenschaften wir Dicke und Permeabilität so ähnlich wie möglich zu machen, geht diese Ausführung der Erfindung einen anderen Weg. Dabei wird in Kauf genommen, dass im Fügebereich die Eigenschaften der Grundstruktur bzw. der Bespannung von Rest der Bespannung unterscheiden können. Stattdessen wird darauf abgezielt, diesen unterschiedlichen Bereich in MD-Richtung so klein wie möglich zu halten. Insbesondere bei Filzen, bei denen die aufgebrachten Vlieslagen als eine Art Diffusor wirken, kann die Unterschiedliche Entwässerung in diesem sehr kleinen Bereich nicht mehr im Papier als Markierung wahrgenommen werden.

Vorteilhaft zur Unterstützung dieses Effektes kann es sein, wenn die zumindest eine Fügestelle, insbesondere alle Fügestellen, durch Verbindungselemente, insbesondere Verbindungsfäden realisiert sind, welche mit zumindest einem, vorzugsweise beiden längsseitigen Enden verschweißt sind.

Insbesondere können als Verbindungselemente Verbindungsfäden verwendet sind, welche in CD-Richtung der Bespannung angeordnet sind, wobei für eine Fügestelle

maximal drei Verbindungsfäden, insbesondere maximal zwei Verbindungsfäden vorgesehen sind.

Wird beispielsweise ein Verbindungsfaden quer über die MD-Fäden der beiden zu fügenden längsseitigen Enden gelegt, und mit diesen verschweißt, so ergibt sich bereits mit einem oder zwei solcher Fäden eine sehr feste Fügeverbindung. Somit ist die Ausdehnung der Fügestelle in MD Richtung extrem klein, und die Auswirkung z.B. einer unterschiedlichen Permeabilität in diesem Bereich ist im Papier nicht mehr erkennbar.

Alternativ oder zusätzlich kann auch vorgesehen sein, dass einer oder mehrere der Verbindungsfäden mit MD-Fäden zumindest eines längsseitigen Endes verwoben sind.

Sehr geeignet ist dafür beispielsweise das Lasertransmissionssschweißen, da die üblichen Polyamidgarne des Gewebes für Laserlicht in einem weiten Frequenzbereich -speziell zwischen 800 nm und 1000 nm- transparent sind, und sehr einfach durch unter Verwendung absorbierender, z.B. schwarzer Verbindungsfäden verschweißt werden können. Der transparente Fügepartner heizt sich bei diesem Fügeverfahren im Wesentlichen nur an der Oberfläche auf. Die Struktur dieses transparenten Fügepartners bleibt dabei weitgehend erhalten. Dies ist beispielsweise vorteilhaft, wenn der transparente Fügepartner ein MD-Faden ist, welcher in der fertigen Bespannung eine Zugbelastung ausgesetzt ist. Dieser wir durch das Lasertransmissionssschweißen nicht wesentlich geschwächt. Eine derartige Fügestelle besitzt auch eine ausreichende Festigkeit, um Verarbeitungsschritte im weiteren Verlauf der Herstellung, insbesondere die Vernadelung zu überstehen. Im Gegensatz dazu sind mittels Ultraschall geschweißte Fügestellen häufig sehr spröde und brüchig und werden durch das Vernadeln zumindest teilweise zerstört. Durch die Zerstörung der Fügestelle können sich wieder einzelne Fadenenden oder Fadenteile lösen und aus der Bespannung herausragen, wodurch Markierungen erzeugt oder die Faserstoffbahn beschädigt werden kann.

Statt Fäden können auch andere Arten von Verbindungselementen eingesetzt werden, wie z.B. gewebte oder nicht gewebte Bändchen, Streifen aus

Polymermaterial oder ähnlichem. Nach dem oben Gesagten ist es generell vorteilhaft, wenn Verbindungselemente in MD-Richtung nur eine geringe Ausdehnung, insbesondere unter 5mm, unter 2mm oder noch besser unter 1mm.

In vorteilhaften Ausführungen kann vorgesehen sein, dass die MD-Fäden die insbesondere zum Formen der Nahtschlaufen verwendet werden, als Monofilamente, insbesondere als Monofilamente mit rundem Querschnitt ausgeführt sind.
Weiterhin kann es vorteilhaft sein, wenn der Durchmesser der MD-Fäden zwischen 0.15mm und 0.7mm, insbesondere zwischen 0.3mm und 0.5mm beträgt.

Neben dem LD/MDYD Verhältnis kann es für die Eigenschaften des Nahtbereiches auch vorteilhaft sein, die sogenannte Schlaufendichte in der Naht anzupassen.

Bei der Bestimmung der Nahtschlaufendichte wird zuerst die Anzahl der Nahtschlaufen pro Längeneinheit ermittelt. Bei einem Gewebe mit einer MD-Fadendichte von 64 Garnen/100mm weist der Nahtbereich durch das Ineinandergreifen der MD-Fäden beider Enden die doppelte Anzahl, also 128 Garne/100mm auf. Multipliziert man die Anzahl der Fäden mit ihrem Durchmesser, so erhält man die Nahtschlaufendichte (Angabe in Prozent) als ein Maß für die Abdeckung des Nahtbereiches durch MD-Fäden. Werden im obigen Beispiel Monofilamente mir einem Durchmesser von 0.5mm verwendet, so ergibt sich eine Nahtschlaufendichte von $\frac{128/0{,}5[mm]}{100\,[mm]} = 64\%$ $\frac{128/0{,}5[mm]}{100\,[mm]} = 64\%$

Es sei an dieser Stelle angemerkt, dass sich die Nahtschlaufendichte einer Bespannung während ihres Herstellungsprozesses ändern kann. So kann es durch thermische Verfahrensschritte zu einem Schrumpf der Bespannung in Querrichtung kommen. Daher ist die Nahtschlaufendichte vor dem ersten thermischen Verfahrensschritt meist niedriger, üblicherweise zwischen 55% und 80%, während sie in der fertigen Bespannung dann höher ist. Die in dieser Anmeldung angegebenen Werte der Nahtschlaufendichte beziehen sich, soweit nicht anderweitig angegeben, auf die fertige Bespannung

In einer bevorzugten Ausführung kann vorgesehen sein, dass die Schlaufendichte der Naht zwischen 64% und 90%, insbesondere zwischen 72% und 86%, speziell zwischen 78% und 82% beträgt. Als besonders vorteilhaft haben sich Werte von 80%, 81%, 82%, 83%, 84% und 85% herausgestellt.

Da tendenziell die Permeabilität der Naht höher ist, als im Rest der Bespannung, kann durch eine vergleichsweise hohe Nahtschlaufendichte die Permeabilität der Naht verringert werden. Eine Erhöhung der Schlaufendichte über 90% hinaus kann jedoch dazu führen, dass die eingangs erwähnte einfache Nahtbarkeit der Bespannung teilweise verloren geht, da es schwieriger wird, die Nahtschlaufen ineinandergreifen zu lassen. Ähnlich wie beim LD/MDYD Verhältnis ist auch der hier angeführte Bereich der Nahtschlaufendichte ein in gewissem Sinne optimaler Bereich für zwei gegenläufige Anforderungen.

In diesem Zusammenhang soll noch einmal auf die Vorteile hingewiesen werden, wenn die Grundstruktur aus Flachgewebe aufgebaut ist. Bei klassischen, rundgewebten Grundstrukturen wir das Gewebe zur Verwendung in der Bespannung um 90° gedreht. Die Kettfäden des Webstuhls werden die CD-Fäden der Bespannung und die Schussfäden die MD Fäden. Bei der Verwendung von Flachgeweben ist dies in den meisten Fällen nicht der Fall. Hier wird das Gewebe nicht gedreht, so dass die MD Fäden der Grundstruktur den Kettfäden des Webstuhls entsprechen. Dies hat Konsequenzen für die jeweilige Fadendichte. Beim Weben werden die Schussfäden im Wesentlichen gerade eingebracht, während die Kettfäden jeweils von oberhalb des Schussfadens nach unterhalb des Schussfadens wechseln. Dies führt beispielsweise bei der Leinwandbindung dazu, dass zwischen zwei benachbarten Schussfäden jeweils die sich kreuzenden Kettfäden verlaufen. Aus diesem Grund können benachbarte Schussfäden nicht beliebig nahe beieinander liegen. Bei den Kettfäden besteht eine derartige Restriktion nicht, da zwischen ihnen keine sich kreuzenden Schussfäden verlaufen. Daher können benachbarte Kettfäden im Prinzip beliebig nahe beieinander angeordnet sein.

Da, wie oben beschrieben, bei Flachgeweben die Schussfäden den MD-Fäden der Bespannung entsprechen, lässt sich bei der Verwendung von Flachgeweben eine höhere MD Fadendichte, und damit auch eine höhere Schlaufendichte erzielen.

Die in dieser Anmeldung beschriebenen Schlaufendichten von mehr als 64%, insbesondere mehr als 72% oder 78% lassen sich mit Rundgeweben entweder gar nicht erzielen, oder mittels extremer Webbedingungen wie einer stark erhöhten Kettspannung, welche zu einem stark beschleunigten Verschleiß des Webstuhls führen.

Mittels dieser Ausführung der Erfindung ist es also möglich, eine Bespannung mit einer Naht zu realisieren, die– durch die hohe Schlaufendichte – eine geringe Permeabilität aufweist, und trotzdem –durch das optimale LD/MDYD-Verhältnis- leicht zu schließen ist. Andere bekannte Methoden zur Reduzierung der Nahtpermeabilität, wie z.B. dem Einfügen eines strömungsbehindernden Elements („scrim“) in den Nahtbereich, führen hingegen zu einem schwierigeren Schließen der Naht.

In vorteilhaften Ausführungen kann der Nahtbereich der Bespannung –nach dem Schließen der Naht mittels des Steckelements - eine Permeabilität aufweisen, die zwischen 80% und 130%, insbesondere zwischen 90% und 120% der Permeabilität der Bespannung in einem nahtfernen Bereich entspricht.

In einer bevorzugten Ausführung weist die Bespannung zumindest an ihrer Papier berührenden Oberseite eine oder mehrere Lagen aus Vliesfasern auf. Insbesondere kann es sich bei der Bespannung um einen Pressfilz handeln. Zudem können auch an der Walzen berührenden Unterseite der Bespannung eine oder mehrere Lagen aus Vliesfasern vorgesehen sein.

Vorteilhafterweise ist dabei vorgesehen, dass ein Teil der Vliesfasern eine Faserfeinheit von 67dtex oder mehr aufweisen. Insbesondere können diese vergleichsweise groben Fasern in direkter Nachbarschaft zu der Grundstruktur angeordnet sein. Häufig werden sie als eine grobe Vlieslage aufgebracht und mit der Grundstruktur vernadelt.

Es können auch Vliesfasern mit einer Feinheit von 44 dtex und weniger verwendet werden. Insbesondere können diese vergleichsweise feinen Fasern an der papierberührenden Oberseite der Bespannung angeordnet sein. Diese feinen Fasern

können auf einer Vlieslage mit den oben erwähnten groben Fasern mit 67 dtex oder mehr angeordnet und mit ihnen vernadelt sein.
Hierdurch kann eine gute Verbindung der Vliesauflage mit der Grundstruktur sowie der einzelnen Vlieslagen untereinander erzielt werden.

In besonders vorteilhaften Ausführungen der Erfindung können zumindest einige der Vliesfasern ein Elastomer, insbesondere ein Polyurethan umfassen oder daraus bestehen. Durch die Verwendung von Elastomeren im Faservlies kann die Bespannung nach dem Durchlauf durch den Pressnip wieder besser expandieren. Dadurch bleibt die Entwässerungseigenschaft der Bespannung länger auf einem hohen Niveau, was für den Betreiber ökonomische Vorteile bietet. Insbesondere im Bereich der Naht und in dem bzw. den Join-Bereichen sind Vliesfasern aus Elastomer vorteilhaft. Hier ist ihre Verwendung auch deshalb vorteilhaft, weil die elastische Wirkung die Markierungstendenzen dieser Stellen weiter reduziert.

Schließlich kann in vorteilhaften Ausführungen der Bespannung auch vorgesehen sein, dass im Bereich der Naht zumindest ein streifenförmiges, strömungsbehinderndes Element vorgesehen ist, welches so eingerichtet ist, dass die Durchlässigkeit für Luft und/oder Wasser im Bereich der Naht im Wesentlichen dieselbe ist, wie in der übrigen Bespannung.
Dieses strömungsbehindernde Element kann auf verschiedene Arten realisiert sein. Beispielsweise kann es als Band aus gewebtem oder nicht gewebtem Material gebildet sein. Alternativ kann es eine Membran, eine Folie oder ein Polymerschaum sein. Das Element kann auch in Form eines gehärteten flüssigen Harzes realisiert sein Der Fachmann wird hier ohne weiteres noch auf weitere geeignete Realisierungsformen kommen können.

Im Folgenden wird die Erfindung anhand schematischer, nicht maßstäblicher Skizzen näher erläutert.

Figuren 1a bis 1c zeigen schematisch den Aufbau bzw. die Herstellung einer Grundstruktur mit einer zweilagigen Laminatstruktur zur Verwendung in einer Bespannung gemäß verschiedenen Ausführungen der Erfindung.

Figuren 2a bis 2c zeigen schematisch den Aufbau bzw. die Herstellung einer Grundstruktur mit einer zweilagigen Laminatstruktur zur Verwendung in einer Bespannung gemäß weiteren Ausführungen der Erfindung.

Figur 3 zeigt eine Bespannung nach einem Aspekt der Erfindung.

Figur 4 zeigt eine Nahtschlaufe einer Bespannung gemäß einem Aspekt der Erfindung.

Figur 5 zeigt eine mögliche Ausführung einer Fügestelle

Figur 1a zeigt ein einzelnes flachgewebtes Element 2 mit einem ersten längsseitigen Ende 21 und einem zweiten längsseitigen Ende 22. in der Draufsicht. Die Stellen 31 und 32 sind die gewählten Faltstellen 31, 32, aus denen die Nahtschlaufen 41,42 gebildet werden. Figur 1b zeigt das flachgewebte Element 2 noch einmal in einer Seitenansicht.

An den Faltstellen 31, 32 können jeweils ein oder mehrere CD Fäden entnommen werden.

Wie in Figur 1c gezeigt werden zur Herstellung der Grundstruktur das flachgewebte Element 2 an Faltstellen 31, 32 gefaltet, und die gefalteten Teile wieder auf das flachgewebte Element 2 abgelegt. So entsteht eine zweilagige Laminatstruktur 1. Die längsseitigen Enden 21, 22, können sich dabei im Bereich des Joins 20 überlappen, berühren oder, wie in Figur 1c gezeigt, einen kleinen Abstand zueinander aufweisen. Der Join 20 kann in verschiedenen Ausführungen der Erfindung als Fügestelle 200 ausgeführt sein, an der zwei längsseitige Enden 21, 22 miteinander verbunden sind. Eine vorteilhafte Fügemethode ist das Schweißen, insbesondere das Ultraschall- und das Lasertransmissionsschweißen. Zur Verbesserung der Stabilität insbesondere bei der Verarbeitung können die beiden Lagen der zweilagigen Laminatstruktur 1 an Fixierstellen 110 miteinander verbunden, insbesondere vernäht sein.

Figur 2a zeigt eine zweilagige Laminatstruktur 1, die zwei flachgewebte Elemente 2, 2a umfasst. Die Nahtschlaufen 41, 42 sind hier durch die MD-Fäden 10 des ersten

flachgewebten Elements 2 gebildet. Das zweite flachgewebte Element 2a ist so angeordnet, dass sein erstes längsseitiges Ende 21a mit dem zweiten längsseitigen Ende 22 des ersten flachgewebten Elementes 2 einen Join-Bereich ausbildet, während sein zweites längsseitiges Ende 22a mit dem ersten längsseitigen Ende 21 des ersten flachgewebten Elementes 2 einen Join-Bereich ausbildet. Diese Join-Bereiche 20 können wieder als Fügestellen 200 ausgeführt sein.
Zur Verbesserung der Stabilität insbesondere bei der Verarbeitung kann das zweite flachgewebte Element 2a an Fixierstellen 110 mit dem ersten flachgewebten Element 2 verbunden, insbesondere vernäht sein.

Figur 2b zeigt eine weitere Ausführung einer zweilagigen Laminatstruktur 1, die zwei flachgewebte Elemente 2, 2a umfasst. Sie unterscheidet sich von der in Figur 2a dargestellten Struktur dadurch, dass eine Nahtschlaufe 41 durch MD-Fäden 10 des ersten flachgewebten Elements 2 gebildet wird, während die zweite Nahtschlaufe 42 durch MD-Fäden 10 des zweiten flachgewebten Elements 2a gebildet wird. Die beiden flachgewebten Elemente 2, 2a können dabei gleich, insbesondere auch gleich lang sein. Alternativ kann aber auch vorgesehen sein, dass sie sich in einem oder mehreren Merkmalen, insbesondere in der Länge, unterscheiden.

Die Figur 2c zeigt eine weitere Ausführung einer zweilagigen Laminatstruktur 1, welche drei flachgewebte Elemente 2, 2a, 2b umfasst.

Figur 3 zeigt eine Ausführung einer Bespannung nach einem Aspekt der Erfindung. Auf der zweilagige Laminatstruktur 1 aus Figur 1c sind dabei Vlieslagen 5a, 5b, 5c, 5d angebracht. Diese sind üblicherweise durch Vernadeln befestigt. Durch die Vernadelung erfolgt im Übrigen noch eine weitere Verbindung der beiden Lagen der zweilagigen Laminatstruktur 1 miteinander.

Figur 4 zeigt eine Nahtschlaufe 42, gebildet aus einem MD-Faden 10. Der MD-Faden 10 ist hier als rundes Monofilament ausgeführt. Auf der oberen Seite der Bespannung ist eine Vlieslage 15 vorgesehen. Zur Bestimmung des LD/MDYD Verhältnisses ist in die Nahtschlaufe 42 ein Kreis einbeschrieben. Dies ist der größte Kreis, welcher sich

vollständig in die Nahtschlaufe 42 einfügen lässt. Die Bestimmung derartiger Kreise und deren Durchmesser ist eine geläufige geometrische Übung. Bei handelsüblichen Mikroskopen ist eine derartige Messung auch im Funktionsumfang der Bedienungssoftware enthalten. Bei den Bespannungen gemäß dieser Erfindung stehen die Nahtschlaufen auch senkrecht oder weitgehend senkrecht, so dass die Problematik einer möglichen Verzerrung nicht auftritt.
Der Durchmesser des Kreises beträgt im Falle der Figur 4 1200 µm. Der Durchmesser des MD Fadens liegt bei 340 µm. Das daraus resultierende LD/MDYD Verhältnis ist daher 1200/340=3.5. Eine Bespannung mit derartigen Nahtschlaufen erfüllt somit das Merkmal des kennzeichnenden Teils des Anspruchs 1.

In Figur 5 ist beispielhaft ein Ausschnitt aus einer Fügestelle 200 dargestellt, welche mittels Lasertransmissionsschweißen hergestellt ist. Die transparenten Fügepartner 100, 105 sind hier mittels eines Verbindungselements 120 miteinander verbunden. Das Verbindungselement 120 ist in Figur 5 exemplarisch als schwarzer Faden 120 realisiert. Bei den transparenten Fügepartnern100, 105 kann es sich beispielsweise um MD-Fäden 10 längsseitiger Enden 21, 22 einer bzw. zweier flachgewebter Elemente 2, 2a, 2b handeln. Man erkennt, dass das Verbindungselement 120 zwar durch den Schweißvorgang merklich deformiert wurde. Die transparenten Fügepartner 100, 105 sind jedoch strukturell weitgehend unbeschädigt. Aufgrund dieser Eigenschaft lassen sich mittels Lasertransmissionsschweißen hergestellte Verbindungen auch von anderen Schweißverbindungen unterscheiden.

Patentansprüche

1. Bespannung, insbesondere Nahtfilz für eine Maschine zur Herstellung einer Faserstoffbahn, insbesondere einer Papier~, Karton~, Tissue~ oder Zellstoffbahn, umfassend eine Grundstruktur, die eine zweilagige Laminatstruktur (1) aus einem oder mehreren flachgewebten Elementen (2, 2a, 2b) umfasst oder daraus besteht, wobei die Laminatstruktur (1) MD-Fäden (10) aufweist, welche an den beiden stirnseitigen Enden der Grundstruktur Nahtschlaufen (41, 42) ausbilden und die beiden Lagen der Laminatstruktur (1) über die Nahtschlaufen (41, 42) miteinander verbunden sind, und wobei die Bespannung durch Verbinden ihrer stirnseitigen Enden mittels einer Naht endlos gemacht ist, und diese Naht durch Ineinandergreifen der Nahtschlaufen (41, 42) beider stirnseitiger Enden und das Einführen eines Steckelements ausgeführt ist, **dadurch gekennzeichnet, dass** der Durchmesser (LD) der Nahtschlaufen (41, 42) und der Durchmesser (MDYD) der zugehörigen MD-Fäden (10) ein Verhältnis LD/MDYD zwischen 2.5 und 4, insbesondere zwischen 2.7 und 3.6 aufweisen.

2. Bespannung gemäß Anspruch 1, dadurch gekennzeichnet, dass zumindest eines insbesondere alle flachgewebten Elemente (2, 2a, 2b) Flottierungen aufweisen, die sich über zwei oder mehrere Fäden erstrecken.

3. Bespannung gemäß einem der vorherigen Ansprüche, **dadurch gekennzeichnet, dass** jedes der flachgewebten Elemente (2. 2a, 2b) ein erstes und ein zweites längsseitiges Ende (21, 22, 21a, 22a) aufweist, und die zweilagige Laminatstruktur (1) zumindest eine Fügestelle (200) aufweist, an der zwei längsseitige Enden (21, 22, 21a, 22a) miteinander verbunden sind, wobei diese längsseitigen Enden (21, 22, 21a, 22a) zu demselben flachgewebten Element (2, 2a, 2b) oder zu verschiedenen flachgewebten Elementen (2, 2a, 2b) gehören können.

4. Bespannung nach Anspruch 3, **dadurch gekennzeichnet, dass** die Verbindung der zwei längsseitige Enden (21, 22, 21a, 22a) durch eine Schweißverbindung,

insbesondere eine mittels Lasertransmissionsschweißen erzeugte Schweißverbindung realisiert ist.

5. Bespannung nach einem der Ansprüche 3 oder 4, **dadurch gekennzeichnet, dass** die Ausdehnung der zumindest einen Fügestelle (200) in Maschinenrichtung (MD) weniger als 15mm, insbesondere weniger als 5mm beträgt.

6. Bespannung nach einem der Ansprüche 3 bis 5, **dadurch gekennzeichnet, dass** die zumindest eine Fügestelle (200) durch Verbindungselemente (120), insbesondere Verbindungsfäden (120) realisiert ist, welche mit zumindest einem, vorzugsweise beiden längsseitigen Enden (21, 22, 21a, 22a) verschweißt sind.

7. Bespannung nach Anspruch 6, **dadurch gekennzeichnet, dass** als Verbindungselemente (120) Verbindungsfäden (120) verwendet sind, welche in CD-Richtung der Bespannung angeordnet sind, wobei für eine Fügestelle (200) maximal drei Verbindungsfäden (120), insbesondere maximal zwei Verbindungsfäden (120) vorgesehen sind.

8. Bespannung nach Anspruch 7, **dadurch gekennzeichnet, dass** eine oder mehrere der Verbindungsfäden (120) mit MD-Fäden (10) zumindest eines längsseitigen Endes (21, 22, 21a, 22a) verwoben sind.

9. Bespannung nach einem der vorherigen Ansprüche, **dadurch gekennzeichnet, dass** die MD-Fäden (10) als Monofilamente, insbesondere als Monofilamente mit rundem Querschnitt ausgeführt sind.

10. Bespannung nach einem der vorherigen Ansprüche**, dadurch gekennzeichnet, dass** der Durchmesser der MD-Fäden (10) zwischen 0.15mm und 0.7mm, insbesondere zwischen 0.3mm und 0.5mm beträgt.

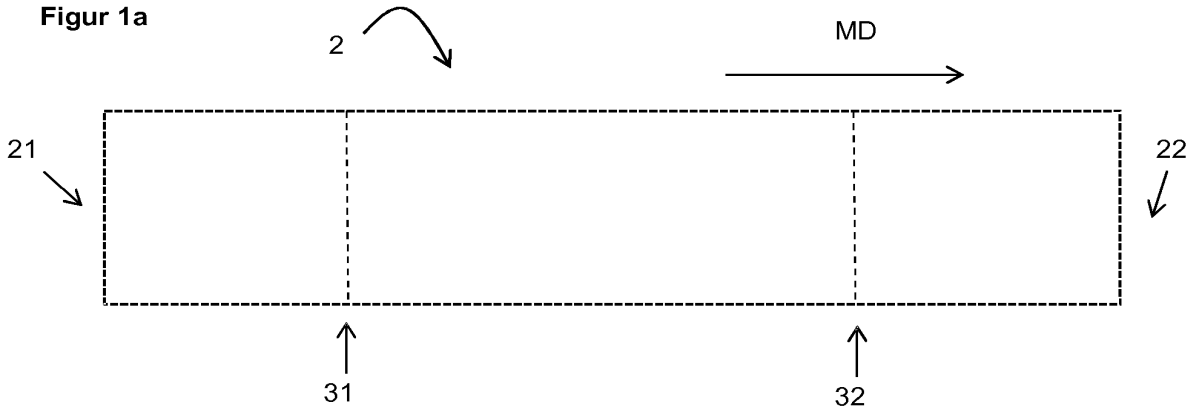
11. Bespannung nach einem der vorigen Ansprüche, **dadurch gekennzeichnet, dass** die Schlaufendichte der Naht zwischen 64% und 90%, insbesondere zwischen 72% und 86% beträgt.

12. Bespannung nach einem der vorherigen Ansprüche**, dadurch gekennzeichnet, dass** die Bespannung zumindest an ihrer Papier berührenden Oberseite eine oder mehrere Lagen (5a, 5b, 5c, 5d) aus Vliesfasern aufweist.

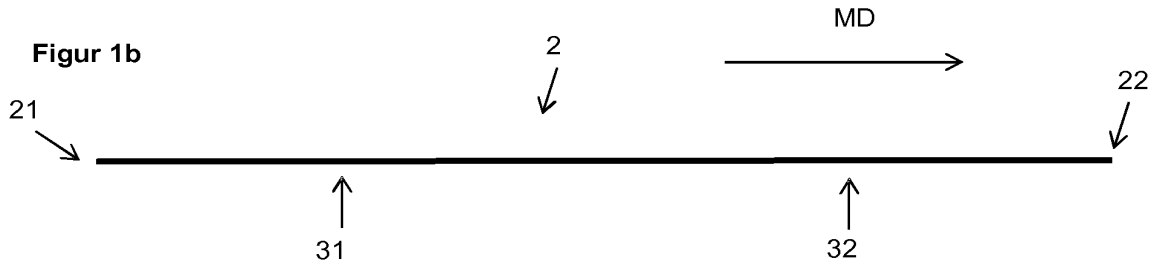
13. Bespannung nach Anspruch 12, **dadurch gekennzeichnet, dass** zumindest einige der Vliesfasern ein Elastomer, insbesondere ein Polyurethan umfassen oder daraus bestehen.

14. Bespannung nach einem der vorherigen Ansprüche, **dadurch gekennzeichnet, dass** im Bereich der Naht zumindest ein streifenförmiges, strömungsbehinderndes Element vorgesehen ist, welches so eingerichtet ist, dass die Durchlässigkeit für Luft und/oder Wasser im Bereich der Naht im Wesentlichen dieselbe ist, wie in der übrigen Bespannung.

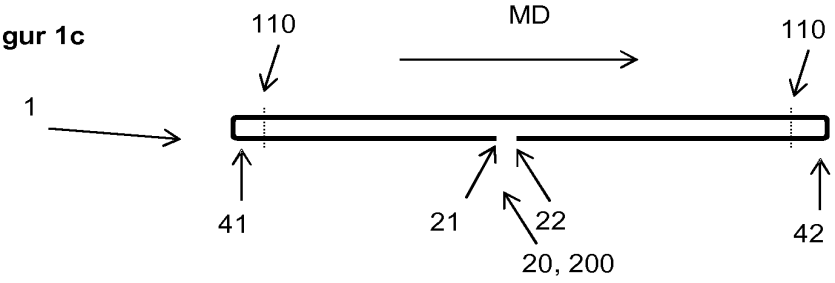
Figur 1a



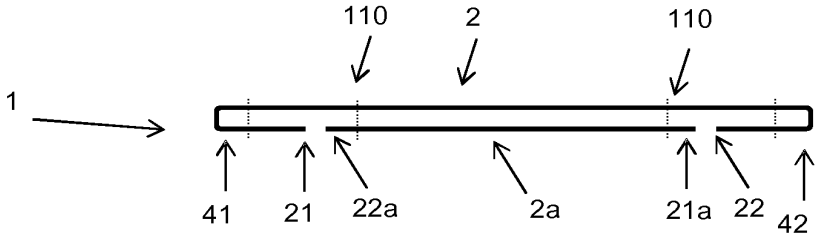
Figur 1b



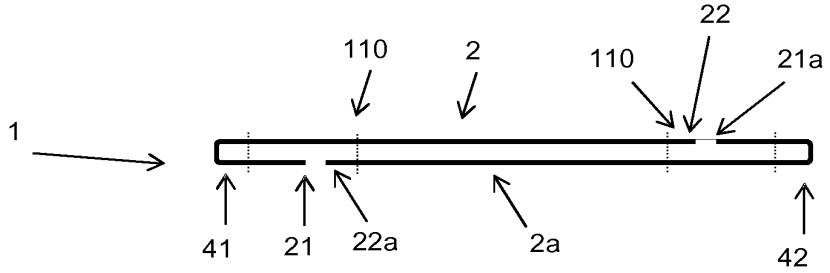
Figur 1c



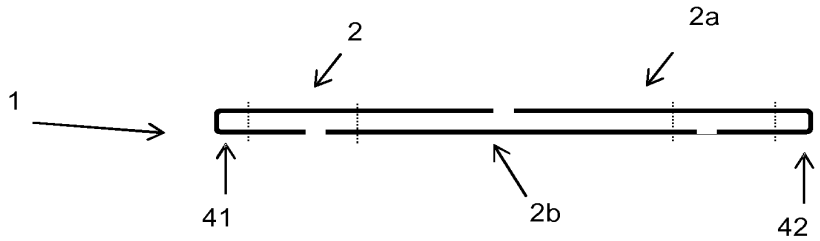
Figur 2a



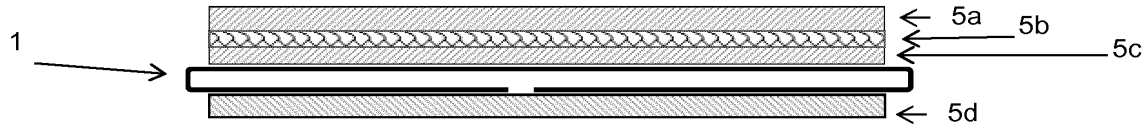
Figur 2b



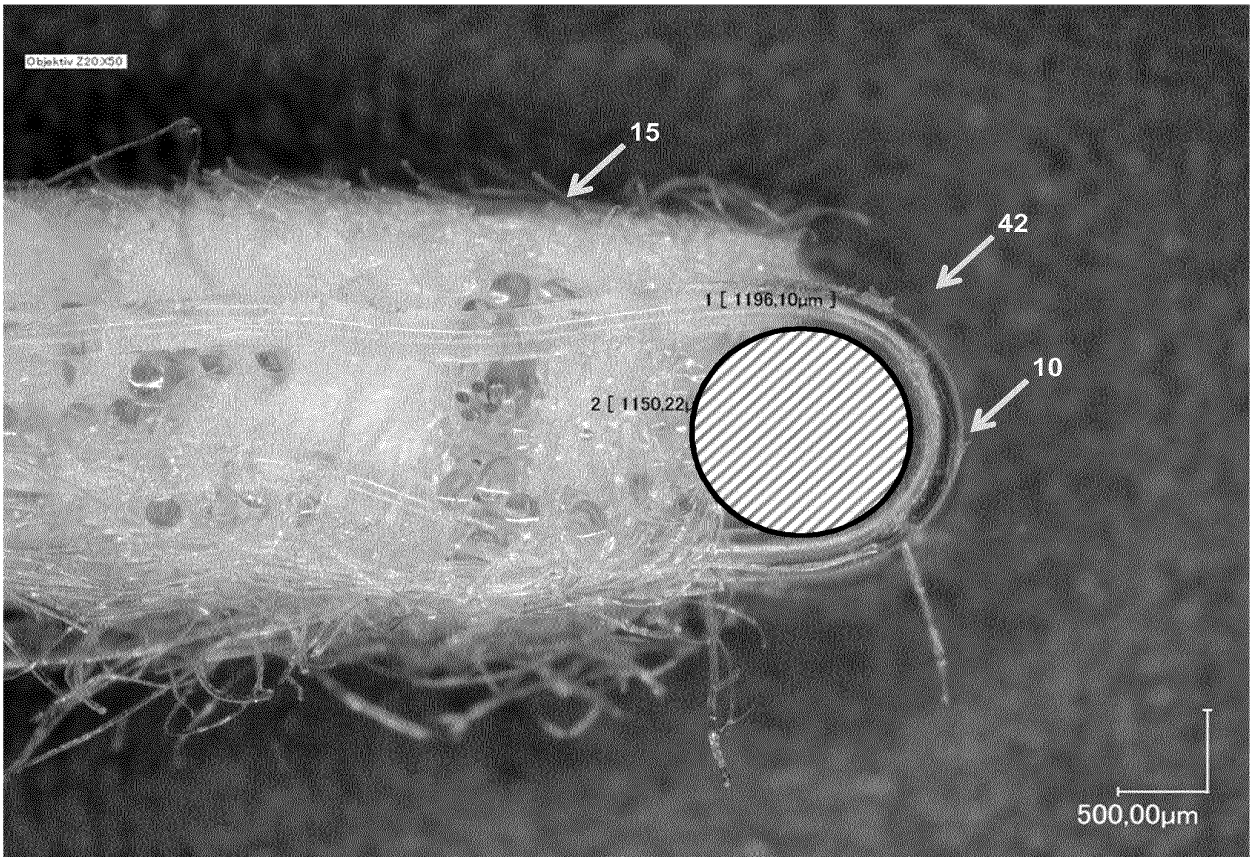
Figur 2c



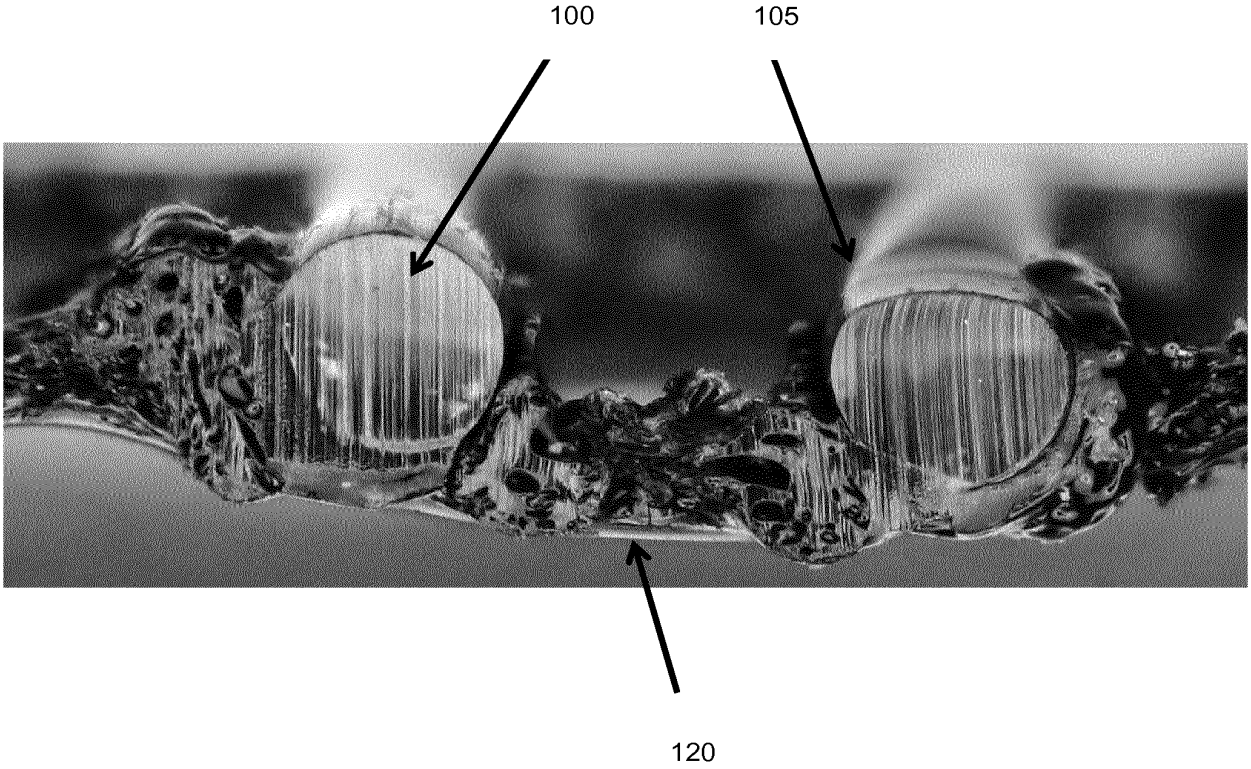
Figur 3



Figur 4



Figur 5



INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2019/055955

A. CLASSIFICATION OF SUBJECT MATTER

D21F 1/00(2006.01)i; ***D21F 7/08***(2006.01)i; ***D21F 7/10***(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)

D21F

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

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

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0425523 A1 (SCAPA GROUP PLC [GB]) 08 May 1991 (1991-05-08) cited in the application column 2, line 24 - column 4, line 6; figures	1
A	US 2017044718 A1 (WICH TORSTEN [US]) 16 February 2017 (2017-02-16) paragraphs [0030] - [0036]; figures	1
A	US 2009090425 A1 (HAWES JOHN M [US] ET AL) 09 April 2009 (2009-04-09) paragraphs [0044] - [0053]; figures	1

☐ 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 another 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	Date of mailing of the international search report
03 April 2019	**15 April 2019**

Name and mailing address of the ISA/EP	Authorized officer
European Patent Office **p.b. 5818, Patentlaan 2, 2280 HV Rijswijk** **Netherlands**	**Maisonnier, Claire**
Telephone No. **(+31-70)340-2040** Facsimile No. **(+31-70)340-3016**	Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/EP2019/055955

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
EP 0425523 A1	08 May 1991	AT 119955 T	15 April 1995
		AU 3839889 A	12 January 1990
		DE 68921754 D1	20 April 1995
		DE 68921754 T2	13 July 1995
		DK 289490 A	05 December 1990
		EP 0425523 A1	08 May 1991
		GB 2238272 A	29 May 1991
		WO 8912717 A1	28 December 1989
US 2017044718 A1	16 February 2017	NONE	
US 2009090425 A1	09 April 2009	BR PI0817343 A2	04 October 2016
		CA 2701224 A1	09 April 2009
		CN 101815821 A	25 August 2010
		EP 2198083 A1	23 June 2010
		JP 5366957 B2	11 December 2013
		JP 2010540794 A	24 December 2010
		KR 20100077011 A	06 July 2010
		RU 2010112547 A	10 November 2011
		TW 200936845 A	01 September 2009
		US 2009090425 A1	09 April 2009
		WO 2009046017 A1	09 April 2009

INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen
PCT/EP2019/055955

A. KLASSIFIZIERUNG DES ANMELDUNGSGEGENSTANDES
INV. D21F1/00 D21F7/08 D21F7/10
ADD.

Nach der Internationalen Patentklassifikation (IPC) oder nach der nationalen Klassifikation und der IPC

B. RECHERCHIERTE GEBIETE

Recherchierter Mindestprüfstoff (Klassifikationssystem und Klassifikationssymbole)
D21F

Recherchierte, aber nicht zum Mindestprüfstoff gehörende Veröffentlichungen, soweit diese unter die recherchierten Gebiete fallen

Während der internationalen Recherche konsultierte elektronische Datenbank (Name der Datenbank und evtl. verwendete Suchbegriffe)
EPO-Internal

C. ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
A	EP 0 425 523 A1 (SCAPA GROUP PLC [GB]) 8. Mai 1991 (1991-05-08) in der Anmeldung erwähnt Spalte 2, Zeile 24 - Spalte 4, Zeile 6; Abbildungen	1
A	US 2017/044718 A1 (WICH TORSTEN [US]) 16. Februar 2017 (2017-02-16) Absätze [0030] - [0036]; Abbildungen	1
A	US 2009/090425 A1 (HAWES JOHN M [US] ET AL) 9. April 2009 (2009-04-09) Absätze [0044] - [0053]; Abbildungen	1

☐ Weitere Veröffentlichungen sind der Fortsetzung von Feld C zu entnehmen ☒ Siehe Anhang Patentfamilie

* Besondere Kategorien von angegebenen Veröffentlichungen :
"A" Veröffentlichung, die den allgemeinen Stand der Technik definiert, aber nicht als besonders bedeutsam anzusehen ist
"E" frühere Anmeldung oder Patent, die bzw. das jedoch erst am oder nach dem internationalen Anmeldedatum veröffentlicht worden ist
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"O" Veröffentlichung, die sich auf eine mündliche Offenbarung, eine Benutzung, eine Ausstellung oder andere Maßnahmen bezieht
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"X" Veröffentlichung von besonderer Bedeutung; die beanspruchte Erfindung kann allein aufgrund dieser Veröffentlichung nicht als neu oder auf erfinderischer Tätigkeit beruhend betrachtet werden
"Y" Veröffentlichung von besonderer Bedeutung; die beanspruchte Erfindung kann nicht als auf erfinderischer Tätigkeit beruhend betrachtet werden, wenn die Veröffentlichung mit einer oder mehreren Veröffentlichungen dieser Kategorie in Verbindung gebracht wird und diese Verbindung für einen Fachmann naheliegend ist
"&" Veröffentlichung, die Mitglied derselben Patentfamilie ist

Datum des Abschlusses der internationalen Recherche	Absendedatum des internationalen Recherchenberichts
3. April 2019	15/04/2019

Name und Postanschrift der Internationalen Recherchenbehörde	Bevollmächtigter Bediensteter
Europäisches Patentamt, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Maisonnier, Claire

2

Formblatt PCT/ISA/210 (Blatt 2) (April 2005)

INTERNATIONALER RECHERCHENBERICHT

Angaben zu Veröffentlichungen, die zur selben Patentfamilie gehören

Internationales Aktenzeichen
PCT/EP2019/055955

Im Recherchenbericht angeführtes Patentdokument	Datum der Veröffentlichung	Mitglied(er) der Patentfamilie	Datum der Veröffentlichung
EP 0425523 A1	08-05-1991	AT 119955 T	15-04-1995
		AU 3839889 A	12-01-1990
		DE 68921754 D1	20-04-1995
		DE 68921754 T2	13-07-1995
		DK 289490 A	05-12-1990
		EP 0425523 A1	08-05-1991
		GB 2238272 A	29-05-1991
		WO 8912717 A1	28-12-1989
US 2017044718 A1	16-02-2017	KEINE	
US 2009090425 A1	09-04-2009	BR PI0817343 A2	04-10-2016
		CA 2701224 A1	09-04-2009
		CN 101815821 A	25-08-2010
		EP 2198083 A1	23-06-2010
		JP 5366957 B2	11-12-2013
		JP 2010540794 A	24-12-2010
		KR 20100077011 A	06-07-2010
		RU 2010112547 A	10-11-2011
		TW 200936845 A	01-09-2009
		US 2009090425 A1	09-04-2009
		WO 2009046017 A1	09-04-2009

PCT-ANTRAG

Ausdruck (Original in elektronischem Format)

0	**Vom Anmeldeamt auszufüllen**	
0-1	Internationales Aktenzeichen	**PCT/EP2019/055955**
0-2	Internationales Anmeldedatum	**11 MAR 2019 (11.03.2019)**
0-3	Name des Anmeldeamts und "PCT International Application"	**RO/EP**

0-4	**Formular PCT/RO/101 PCT-Antrag**	
0-4-1	Erstellt mit	CMS Online Filing Version CMS 1.15 MT/FOP 20020701/0.20.5.20
0-5	**Antragsersuchen** Der Unterzeichnete beantragt, dass die vorliegende internationale Anmeldung nach dem Vertrag über die internationale Zusammenarbeit auf dem Gebiet des Patentwesens behandelt wird	
0-6	**(Vom Anmelder gewähltes) Anmeldeamt**	Europäisches Patentamt (EPA) (RO/EP)
0-7	**Aktenzeichen des Anmelders oder Anwalts**	22858 WO PFP
I	**Bezeichnung der Erfindung**	BESPANNUNG
II	**Anmelder**	
II-1	Diese Person ist	Nur Anmelder
II-2	Anmelder für	Alle Bestimmungsstaaten
II-4	Name	VOITH PATENT GMBH
II-5	Anschrift	Sankt Pöltener Straße 43 89522 Heidenheim Deutschland
II-6	Staatsangehörigkeit (Staat)	DE
II-7	Sitz/Wohnsitz (Staat)	DE
II-8	Telefonnr.	07321-37-6788
II-9	Telefaxnr.	07321-37-7003
II-10	E-Mail	pat-dept-office@voith.com
II-10(a)	E-Mail-Ermächtigung Das Anmeldeamt, die Internationale Recherchenbehörde, das Internationale Büro und die mit der internationalen vorläufigen Prüfung beauftragte Behörde werden ermächtigt, diese E-Mail-Adresse zu benutzen, um Mitteilungen bezüglich dieser internationalen Anmeldung zu übersenden, soweit das Amt oder die Behörde dazu bereit ist:	ausschließlich in elektronischer Form (Mitteilungen werden nicht in Papierform versandt)

PCT-ANTRAG

Ausdruck (Original in elektronischem Format)

III-1	**Anmelder und/oder Erfinder**	
III-1-1	Diese Person ist	Erfinder nur
III-1-3	Erfinder für	
III-1-4	Name (FAMILIENNAME, Vorname)	EBERHARDT DR., Robert
III-1-5	Anschrift	Barbara-Stech-Weg 19 73479 Ellwangen Deutschland
III-2	**Anmelder und/oder Erfinder**	
III-2-1	Diese Person ist	Erfinder nur
III-2-3	Erfinder für	
III-2-4	Name (FAMILIENNAME, Vorname)	KLASCHKA, Susanne
III-2-5	Anschrift	Sülzburgstr. 36 50937 Köln Deutschland
V	**BESTIMMUNGEN**	
V-1	**Die Einreichung dieses Antrags umfaßt gemäß Regel 4.9 Absatz a die Bestimmung aller Vertragsstaaten, für die der PCT am internationalen Anmeldedatum verbindlich ist, und, insoweit verfügbar, für jede Art von Schutzrecht und sowohl für ein regionales als auch für ein nationales Patent**	
VI-1	**Priorität einer früheren nationalen Anmeldung beansprucht**	
VI-1-1	Anmeldedatum	15. März 2018 (15.03.2018)
VI-1-2	Nummer	102018105956.6
VI-1-3	Staat oder Mitglied der WTO	DE
VI-2	**Einbeziehung durch Verweis :** Ist ein in Artikel 11 Absatz 1 Ziffer iii Buchstabe d oder e genannter Bestandteil der internationalen Anmeldung oder ein in Regel 20.5 Absatz a genannter Teil der Beschreibung, der Ansprüche oder der Zeichnungen nicht anderswo in der internationalen Anmeldung, aber vollständig in einer früheren Anmeldung enthalten, deren Priorität, zu dem Datum, an dem ein oder mehrere in Artikel 11 Absatz 1 Ziffer iii genannte Bestandteile zuerst beim Anmeldeamt eingegangen sind, beansprucht wird, so wird dieser Bestandteil oder Teil, vorbehaltlich der Bestätigung nach Regel 20.6, für die Zwecke der Regel 20.6 in diese internationale Anmeldung einbezogen.	
VII-1	**Gewählte Internationale Recherchenbehörde**	Europäisches Patentamt (EPA) (ISA/EP)

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VIII	**Erklärungen**	Anzahl der Erklärungen	
VIII-1	Erklärung hinsichtlich der Identität des Erfinders	–	
VIII-2	Erklärung hinsichtlich der Berechtigung des Anmelders, zum Zeitpunkt des internationalen Anmeldedatums, ein Patent zu beantragen und zu erhalten	–	
VIII-3	Erklärung hinsichtlich der Berechtigung des Anmelders, zum Zeitpunkt des internationalen Anmeldedatums, die Priorität einer früheren Anmeldung zu beanspruchen	–	
VIII-4	Erfindererklärung (nur im Hinblick auf die Bestimmung der Vereinigten Staaten von Amerika)	–	
VIII-5	Erklärung hinsichtlich unschädlicher Offenbarungen oder Ausnahmen von der Neuheitsschädlichkeit	–	
IX	**Kontrolliste**	Anzahl der Blätter	Elektronische Datei(en) beigefügt
IX-1	Antrag (inklusive Erklärungsblätter)	4	✓
IX-2	Beschreibung	16	✓
IX-3	Ansprüche	3	✓
IX-4	Zusammenfassung	1	✓
IX-5	Zeichnung(en)	4	✓
IX-7	INSGESAMT	28	
	Beigefügte Unterlagen	Unterlage(n) in Papierform beigefügt	Elektronische Datei(en) beigefügt
IX-8	Blatt für die Gebührenberechnung	–	✓
IX-20	**Nr. der Abb. der Zeichn., die mit der Zusammenf. veröffentlicht werden soll**	4	
IX-21	**Sprache der int. Anmeldung**	Deutsch	
X-1	**Unterschrift des Anmelders, des Anwalts oder des Gemeinsamen Vertreters**	/Rainer Schmachtel/	
X-1-1	Name	VOITH PATENT GMBH	
X-1-2	Name der unterzeichnenden Person	Rainer Schmachtel	
X-1-3	Eigenschaft (sofern sich dies nicht eindeutig aus dem Antrag ergibt)	(Applicant)	

VOM ANMELDEAMT AUSZUFÜLLEN

10-1	**Datum des tatsächlichen Eingangs dieser internationalen Anmeldung**	**11 MAR 2019 (11.03.2019)**
10-2	**Zeichnung(en):**	
10-2-1	Eingegangen ✓	
10-2-2	Nicht eingegangen	
10-3	**Geändertes Eingangsdatum aufgrund nachträglich, jedoch fristgerecht eingeg. Unterlage(n) oder Zeichnung(en) zur Vervollständigung dieser int. Anmeldung**	
10-4	**Datum des fristgerechten Eingangs der Berichtigung nach PCT Artikel 11(2)**	
10-5	**Internationale Recherchenbehörde**	**ISA/EP**
10-6	**Übermittlung des Recherchenexemplars bis zur Zahlung der Recherchengebühr aufgeschoben**	

VOM INTERNATIONALEN BÜRO AUSZUFÜLLEN

11-1	**Datum des Eingangs des Aktenexemplars beim Internationalen Büro**	

BUNDESREPUBLIK DEUTSCHLAND

Prioritätsbescheinigung
DE 10 2018 105 956.6
über die Einreichung einer Patentanmeldung

Aktenzeichen:	10 2018 105 956.6
Anmeldetag:	15. März 2018
Anmelder/Inhaber:	Voith Patent GmbH, 89522 Heidenheim, DE
Bezeichnung:	Bespannung
IPC:	D21F 7/10; D03D 1/00; D21F 7/08; D21F 1/10

Die angehefteten Stücke sind eine richtige und genaue Wiedergabe der Teile der am 15. März 2018 eingereichten elektronischen Dokumente dieser Patentanmeldung unabhängig von gegebenenfalls durch das Druckverfahren bedingten Farbabweichungen.

München, den 21. März 2019
Deutsches Patent- und Markenamt
Die Präsidentin
Im Auftrag

Zellner

Voith Patent GmbH
89522 Heidenheim

Akte: 22858 / PFP
„'Infinity-Geometrie Nahtschlaufe'"

Bespannung

Die Erfindung betrifft eine Bespannung, insbesondere Nahtfilz für eine Maschine zur Herstellung einer Faserstoffbahn gemäß dem Oberbegriff des Anspruchs 1.

Bespannungen, die in Papiermaschinen zum Einsatz kommen, bestehen üblicherweise aus endlosen Bandschlaufen. Diese Bandschlaufen werden im Betrieb der Maschine kontinuierlich über eine Vielzahl von Stütz- und Leitelementen im Kreis geführt und stehen dabei stets unter eine Zugspannung. Zudem sind sie Belastungen durch Pressen, Saugelementen und ähnlichem ausgesetzt.
Um diesen Belastungen dauerhaft standhalten zu können, weisen solche Bespannungen häufig eine gewebte Grundstruktur auf.

Es sind verschiedene Möglichkeiten bekannt, eine gewebte Grundstruktur in der für die Bespannung benötigten Endloskonfiguration herzustellen. Am häufigsten werden solche Strukturen rund-gewebt. Dabei wird direkt auf dem Webstuhl eine schlauchförmige Gewebestruktur erzeugt. Beim Einsatz in einer Papiermaschine wird dieser Schlauch gedreht, so dass sie Schussfäden des Webstuhls zu dem Maschinenrichtungs-Fäden (MD-Fäden) der Bespannung werden.
Diese Art des Webens ist jedoch sehr zeitaufwändig. Zudem muss beim Weben bereits die benötigte Länge der Bespannung exakt bekannt sein. Ein Weben ‚auf Vorrat' ist nicht möglich.

Um eine effizientere Art der Herstellung zu ermöglichen, schlägt die EP 0 425 523 die Verwendung von flach gewebten Bahnen vor. Diese werden in der doppelten Länge der benötigten Bespannung bereitgestellt. Durch Umfalten und Aufeinander-ablegen der längsseitigen Enden wird eine zweilagige Laminatstruktur erzeugt. Durch Entfernen von CD-Fäden an den Faltstellen werden Nahtschlaufen erzeugt. Durch Ineinandergreifen der Nahtschlaufen beider stirnseitiger Enden und das Einführen eines Steckelements kann diese Grundstruktur endlos gemacht werden. Im Gegensatz zu den rundgewebten Strukturen sind hier die Kettfäden des Gewebes die MD-Fäden der Bespannung. Auf diese Weise lassen sich Nahtbespannungen sehr

effizient herstellen. Insbesondere kann ein Flachgewebe bereits auf Vorrat produziert und als Rolle gelagert werden, wenn die Dimensionen der fertigen Bespannung noch nicht bekannt sind. Zur Fertigung der Bespannung muss dann nur die benötigte Länge von der Rolle abgewickelt und in der Breite gegebenenfalls auf die Bespannungsbreite gekürzt werden.

Diese Art der Herstellung bringt jedoch auch Nachteile mit sich.
Zum einen liegen diese im Bereich der Naht. An der Nahtstelle unterscheiden sich die Eigenschaften von denen des restlichen Teils der Bespannung. Häufig ist hierbeispielsweise die Permeabilität für Wasser und Luft höher, als im Rest der Bespannung. Dadurch kann es zu einer Qualitätseinbuße durch Markierungen im Papier kommen.
Eine weitere kritische Stelle ist der sogenannte „Join". Durch das Umfalten kommen die beiden längsseitigen Enden auf einer Seite der Grundstruktur zu liegen. Sie können dabei auf Stoß, überlappend oder mit Abstand angeordnet sein. Auch an dieser Stelle unterscheiden sich die Eigenschaften der Grundstruktur vom übrigen Bereich, wodurch Markierungen im Papier entstehen können.

Es ist daher die Aufgabe der vorliegenden Erfindung, eine Bespannung anzugeben, die schnell und ökonomisch herstellbar sowie einsetzbar ist, und gleichzeitig die aus dem Stand der Technik bekannten Qualitätsmängel überwindet.

Diese Aufgabe wird vollständig gelöst durch eine Bespannung nach dem Kennzeichen des Anspruchs 1.

Zum besseren Verständnis der Erfindung seien noch einige Erläuterungen und Definitionen vorangestellt, welche im Rahmen dieser Anwendung verwendet werden.

Unter MD-Fäden sollen Fäden verstanden werden, die in Längsrichtung der Grundstruktur, bzw. der Bespannung orientiert sind, oder von dieser um maximal 10° abweichen. (MD – machine direction)

Unter CD-Fäden sollen Fäden verstanden sind, die in Querrichtung der Grundstruktur bzw. der Bespannung orientiert sind, oder von dieser um maximal 10° abweichen. (CD-cross direction).

Im Rahmen dieser Anmeldung wird der Begriff ‚Durchmesser eines Fadens' verwendet. Bei runden Fäden ist dieser Begriff wohldefiniert.
Für Monofilamente, die von der runden Form abweichen, oder auch für aus mehreren Monofilamenten gezwirnte Fäden soll unter dem Durchmesser des Fadens der Durchmesser desjenigen Kreises verstanden werden, welcher dieselbe Fläche aufweist, wie der Querschnitt des Fadens, bzw. wie die Summe der Querschnitte der einzelnen Monofilamente.
Für ein Monofilament mit quadratischem Querschnitt und 1 mm Kantenläge ergäbe sich somit der folgende Durchmesser D:

$$A = 1[mm^2] = \pi r^2 \Rightarrow r = \sqrt{\frac{1}{\pi}}\,[mm] \Rightarrow D = 2r \approx 1{,}12\,[mm]$$

Zur Bestimmung des Durchmessers einer Nahtschlaufe wird der größte Kreis ermittelt, welcher sich vollständig in die Nahtschlaufe einfügen lässt. Der Durchmesser dieses Kreises wird dann als der Durchmesser der Nahtschlaufe betrachtet.

Es wird eine Bespannung, insbesondere ein Nahtfilz für eine Maschine zur Herstellung einer Faserstoffbahn, insbesondere einer Papier~, Karton~, Tissue~ oder Zellstoffbahn vorgeschlagen. Die Bespannung umfasst eine Grundstruktur, die eine zweilagige Laminatstruktur aus einem oder mehreren flachgewebte Elemente umfasst oder daraus besteht.

Dabei weist die Laminatstruktur MD-Fäden auf, welche an den beiden stirnseitigen Enden der Grundstruktur Nahtschlaufen ausbilden und über die die beiden Lagen der Laminatstruktur miteinander verbunden sind. Die Bespannung ist durch Verbinden ihrer stirnseitigen Enden mittels einer Naht endlos gemacht. Diese Naht ist durch das

Ineinandergreifen der Nahtschlaufen beider stirnseitiger Enden und das Einführen eines Steckelements gebildet.

Erfindungsgemäß ist dabei vorgesehen, dass der Durchmesser der Nahtschlaufen (LD-loop diameter) und der Durchmesser der zugehörigen MD-Fäden (MDYD-MD yarn diameter) ein Verhältnis LD/MDYD zwischen 2.5 und 4, insbesondere zwischen 2.7 und 3.6 aufweisen.

Versuche der Anmelderin haben ergeben, dass bei den erfindungsgemäßen LD/MDYD-Verhältnissen die entstehende Naht in vielerlei Hinsicht optimal ist.
Zum einen weist sie eine sehr hohe Festigkeit auf, ohne die ein erfolgreicher Einsatz z.B. als Nahtfilz nicht möglich ist.
Zudem ist das Schließen der Naht sehr einfach möglich. Die Naht einer Nahtbespannung wird üblicherweise in der Papiermaschine selbst durch Einziehen eines Steckelements, auch Pintle oder Steckdraht genannt, geschlossen. Dieses Einziehen geschieht händisch, und kann besonders bei breiten Maschinen ein langwieriger Prozess sein. Dadurch, dass der Schlaufendurchmesser im Verhältnis zum MD-Faden Durchmesser nicht zu klein wird, wird das Einziehen des Steckdrahtes erleichtert. Zu diesem ergonomischen Vorteil verkürzt sich die Zeit für das Einziehen einer neuen Bespannung, was für den Betreiber der Anlage ökonomische Vorteile bietet.
Jedoch darf der Durchmesser, bzw. das LD/MDYD Verhältnis auch nicht zu groß werden. Zu große Schlaufen können einerseits zu mechanischen Markierungen im Papier führen, indem sich die Biegungen der Schlaufe z.B. beim Durchlaufen eines Pressnips in das Papier einprägen. Andererseits bedeuten große Schlaufen auch, dass der Nahtbereich selbst vergleichsweise groß wird. Da sich dieser Nahtbereich strukturell vom Rest der Bespannung unterscheidet, und insbesondere auch eine veränderte Permeabilität für Wasser und/oder Luft aufweist, besteht im Nahtbereich die Gefahr von hydraulischen Markierungen im Papier aufgrund einer unterschiedlichen Entwässerung. Aus diesem Grund ist es wünschenswert, den Naht Bereich so klein wie möglich zu halten.

Der erfindungsgemäße Bereich LD/MDYD zwischen 2.5 und 4, insbesondere zwischen 2.7 und 3.6 hat sich hier als der optimale Kompromiss erwiesen.
Insbesondere hat die Anmelderin erkannt, dass als charakterisierende Größe nicht der absolute Schlaufendurchmesser (in mm), sondern der Relativwert LD/MDYD herangezogen werden muss.

Vorteilhafte Ausführungen der Erfindung sind in den abhängigen Ansprüchen beschrieben.

Es kann vorgesehen sein, dass die Grundstruktur neben der zweilagigen Laminatstruktur noch weitere Komponenten umfasst. So kann z.B. noch eine weitere Gewebelage und/der eine Gelegelage und/oder eine Vlieslage vorgesehen sein. Die zusätzlichen Komponenten können außen auf der zweilagigen Laminatstruktur angeordnet sein. Alternativ oder zusätzlich kann eine zusätzliche Komponente auch zwischen den beiden Lagern der zweilagigen Laminatstruktur angeordnet sein.

Die beiden Lagen der zweilagigen Laminatstruktur können aus einem einzigen flachgewebten Element gebildet sein. Dieses Flachgewebe weist – zumindest in etwa -die doppelte Länge der späteren Bespannung auf. Durch Falten und Ablegen der beiden Enden des Flachgewebes auf den Mittelteil des Flachgewebes entsteht eine doppellagige Struktur wobei an sich den Faltstellen die Nahtschlaufen ausbilden. Die längsseitigen Enden des flachgewebten Elementes können dabei in einem sogenannten ‚Join'-Bereich auf Stoß, überlappend oder mit Abstand angeordnet sein. Der Überlapp bzw. der Abstand beträgt dabei vorteilhafterweise weniger als 5cm, insbesondere weniger als 2 cm.

Alternativ können die beiden Lagen aus mehreren flachgewebten Elementen gebildet sein. Dabei können alle flachgewebten Elemente dieselbe Länge aufweisen. Es kann jedoch auch vorgesehen sein, dass diese flachgewebten Elemente unterschiedliche Längen aufweisen. Auch in diesen Ausführungen sind die Nahtschlaufen durch umschlagen von einem oder zwei flachgewebten Elementen gebildet. Auf diese

Weise sind die beiden Lagen der Laminatstruktur auch hier durch die Nahtschlaufen miteinander verbunden.
Umfasst die Grundstruktur mehrere flachgewebte Elemente so entstehen auch mehrere Join-Bereiche, für die dasselbe gilt, wie oben für den Fall eines Join-Bereiches beschrieben.
Bei der Verwendung von mehreren flachgewebten Elementen besteht die Möglichkeit, dass alle Elemente aus demselben Gewebe bestehen. Alternativ kann aber auch vorgesehen sein, dass sich die Elemente in einem oder mehreren Merkmalen unterscheiden. Dabei kann es sich bei den Merkmalen um das Webmuster handeln, das Material, den Durchmesser bzw. den Aufbau der MD-, bzw. CD-Fäden oder andere Kennzeichen des Gewebes, die dem Fachmann bekannt sind.

Eines oder alle der flachgewebten Elemente können beispielsweise als ‚plain weave', also mittels einer Leinwandbindung realisiert sein. Diese Art des Gewebes ist sehr einfach und schnell herzustellen, was ökonomisch vorteilhaft ist.

Ein bekannter Effekt bei zweilagigen Gewebestrukturen ist jedoch der Moiré Effekt. Dieser tritt bei zweilagigen Leinwandgeweben verstärkt auf. Zur Reduzierung dieses Effektes, und damit auch zur Reduzierung der Gefahr von Markierungen im Papier, die durch diesen Effekt ausgelöst werden, kann es vorteilhaft sein, wenn zumindest eines oder alle der flachgewebten Elemente kein Leinwandgewebe sind.
Insbesondere kann es hierfür vorteilhaft sein, wenn eines oder alle der flachgewebten Elemente Flottierungen aufweist, die sich über zwei oder mehrere Fäden erstrecken. Somit kann die Stärke des Moiré-Effekts reduziert werden. Trotzdem bleibt der Vorteil der einfachen Erzeugung der Nahtschlaufen erhalten.

Als Steckelement können alle aus dem Stand der Technik bekannten Steckelemente verwendet werden. Insbesondere können Steckdrähte aus einem oder mehreren Filamenten eingesetzt werden.

Die beiden Lagen der zweilagige Laminatstruktur können vorteilhafterweise durch Vernähen oder andere geeignete Techniken miteinander verbunden werden. Bevorzugt können solche Verbindungen in der Nähe der Nahtschlaufen und/oder in der Nähe der Join-Bereiche vorgesehen sein.

In bevorzugten Ausführungen kann vorgesehen sein, dass jedes der flachgewebten Elemente ein erstes und ein zweites längsseitiges Ende aufweist, und die zweilagige Laminatstruktur zumindest eine Fügestelle aufweist, an der zwei längsseitige Enden miteinander verbunden sind. In dieser Ausführung ist also zumindest einer der Join-Bereiche als Fügestelle ausgeführt. Dabei können die gefügten längsseitigen Enden, wie oben beschrieben zu demselben flachgewebten Element oder zu verschiedenen flachgewebten Elementen gehören können.

Die Verbindung an der bzw. den Fügestellen kann durch eine Vielzahl von bekannten Verfahren erfolgen. Insbesondere kann die Verbindung an der zumindest einen Fügestelle durch eine Klebeverbindung und/oder eine Schweißverbindung realisiert ist. So sind beispielsweise mittels Ultraschall oder mittels eines Lasers geschweißte Fügestellen möglich. Besonders vorteilhaft ist das Verschweißen mittels eines NIR-Lasers im Transmissionsschweißverfahren. Das Lasertransmissionssschweißen ist insbesondere deshalb vorteilhaft, da die üblichen Polyamidgarne des Gewebes für Laserlicht in einem weiten Frequenzbereich transparent sind, und sehr einfach durch unter Verwendung absorbierender, z.B. schwarzer Verbindungsfäden verschweißt werden können.

Ein Verbinden der längsseitigen Enden durch eine Fügestelle bietet eine Reihe von Vorteilen. Zum einen wird die Zugfestigkeit der zweilagigen Laminatstruktur dadurch erhöht. Die Fügestelle dient zudem auch dazu, die losen Enden der MD Fäden an den längsseitigen Enden besser zu fixieren. Ohne eine solche Fixierung kann es bei manchen Anwendungen dazu kommen, dass sich diese Enden während des Betriebs der Bespannung lösen, und durch eventuell vorhandene Vlieslagen etc. hindurch an die Oberfläche der Bespannung transportiert werden. Dort können diese losen Enden zu Beschädigungen und Markierungen in der produzierten Faserstoffbahn führen.

Durch die Fixierung der losen Enden durch die Fügestelle kann ein Herausarbeiten dieser Enden ganz oder weitgehend vermieden werden.

Bevorzugt kann vorgesehen sein, dass die Ausdehnung der zumindest einen Fügestelle in Maschinenrichtung (MD) weniger als 15mm, weniger als 10mm, insbesondere weniger als 5mm beträgt. Da an den Join- bzw. Fügestellen auch wieder die Gefahr unterschiedlicher Entwässerungsverhältnisse verglichen mit dem Rest der Bespannung besteht, ist eine geringe Ausdehnung dieser Bereiche vorteilhaft zur Reduzierung der Markierungsneigung.

Während bisher im Stand der Technik versucht wurde, den Join- bzw.- Fügebereich dem Rest der Bespannung in wesentlichen Eigenschaften wir Dicke und Permeabilität so ähnlich wie möglich zu machen, geht diese Ausführung der Erfindung einen anderen Weg. Dabei wird in Kauf genommen, dass im Fügebereich die Eigenschaften der Grundstruktur bzw. der Bespannung von Rest der Bespannung unterscheiden können. Stattdessen wird darauf abgezielt, diesen unterschiedlichen Bereich in MD-Richtung so klein wie möglich zu halten. Insbesondere bei Filzen, bei denen die aufgebrachten Vlieslagen als eine Art Diffusor wirken, kann die Unterschiedliche Entwässerung in diesem sehr kleinen Bereich nicht mehr im Papier als Markierung wahrgenommen werden.

Vorteilhaft zur Unterstützung dieses Effektes kann es sein, wenn die zumindest eine Fügestelle, insbesondere alle Fügestellen, durch Verbindungselemente, insbesondere Verbindungsfäden realisiert sind, welche mit zumindest einem, vorzugsweise beiden längsseitigen Enden verschweißt sind.

Insbesondere können als Verbindungselemente Verbindungsfäden verwendet sind, welche in CD-Richtung der Bespannung angeordnet sind, wobei für eine Fügestelle maximal drei Verbindungsfäden, insbesondere maximal zwei Verbindungsfäden vorgesehen sind.

Wird beispielsweise ein Verbindungsfaden quer über die MD-Fäden der beiden zu fügenden längsseitigen Enden gelegt, und mit diesen verschweißt, so ergibt sich bereits mit einem oder zwei solcher Fäden eine sehr feste Fügeverbindung. Somit ist

die Ausdehnung der Fügestelle in MD Richtung extrem klein, und die Auswirkung z.B. einer unterschiedlichen Permeabilität in diesem Bereich ist im Papier nicht mehr erkennbar.
Alternativ oder zusätzlich kann auch vorgesehen sein, dass einer oder mehrere der Verbindungsfäden mit MD-Fäden zumindest eines längsseitigen Endes verwoben sind.

Sehr geeignet ist dafür beispielsweise das Lasertransmissionssschweißen, da die üblichen Polyamidgarne des Gewebes für Laserlicht in einem weiten Frequenzbereich -speziell zwischen 800 nm und 1000 nm- transparent sind, und sehr einfach durch unter Verwendung absorbierender, z.B. schwarzer Verbindungsfäden verschweißt werden können. Der transparente Fügepartner heizt sich bei diesem Fügeverfahren im Wesentlichen nur an der Oberfläche auf. Die Struktur dieses transparenten Fügepartners bleibt dabei weitgehend erhalten. Dies ist beispielsweise vorteilhaft, wenn der transparente Fügepartner ein MD-Faden ist, welcher in der fertigen Bespannung eine Zugbelastung ausgesetzt ist. Dieser wir durch das Lasertransmissionssschweißen nicht wesentlich geschwächt. Eine derartige Fügestelle besitzt auch eine ausreichende Festigkeit, um Verarbeitungsschritte im weiteren Verlauf der Herstellung, insbesondere die Vernadelung zu überstehen. Im Gegensatz dazu sind mittels Ultraschall geschweißte Fügestellen häufig sehr spröde und brüchig und werden durch das Vernadeln zumindest teilweise zerstört. Durch die Zerstörung der Fügestelle können sich wieder einzelne Fadenenden oder Fadenteile lösen und aus der Bespannung herausragen, wodurch Markierungen erzeugt oder die Faserstoffbahn beschädigt werden kann.

Statt Fäden können auch andere Arten von Verbindungselementen eingesetzt werden, wie z.B. gewebte oder nicht gewebte Bändchen, Streifen aus Polymermaterial oder ähnlichem. Nach dem oben Gesagten ist es generell vorteilhaft, wenn Verbindungselemente in MD-Richtung nur eine geringe Ausdehnung, insbesondere unter 5mm, unter 2mm oder noch besser unter 1mm.

In vorteilhaften Ausführungen kann vorgesehen sein, dass die MD-Fäden die insbesondere zum Formen der Nahtschlaufen verwendet werden, als Monofilamente, insbesondere als Monofilamente mit rundem Querschnitt ausgeführt sind.
Weiterhin kann es vorteilhaft sein, wenn der Durchmesser der MD-Fäden zwischen 0.15mm und 0.7mm, insbesondere zwischen 0.3mm und 0.5mm beträgt.

Neben dem LD/MDYD Verhältnis kann es für die Eigenschaften des Nahtbereiches auch vorteilhaft sein, die sogenannte Schlaufendichte in der Naht anzupassen.

Bei der Bestimmung der Nahtschlaufendichte wird zuerst die Anzahl der Nahtschlaufen pro Längeneinheit ermittelt. Bei einem Gewebe mit einer MD-Fadendichte von 64 Garnen/100mm weist der Nahtbereich durch das Ineinandergreifen der MD-Fäden beider Enden die doppelte Anzahl, also 128 Garne/100mm auf. Multipliziert man die Anzahl der Fäden mit ihrem Durchmesser, so erhält man die Nahtschlaufendichte (Angabe in Prozent) als ein Maß für die Abdeckung des Nahtbereiches durch MD-Fäden. Werden im obigen Beispiel Monofilamente mir einem Durchmesser von 0.5mm verwendet, so ergibt sich eine Nahtschlaufendichte von $\frac{128/0{,}5\,[mm]}{100\,[mm]} = 64\%$
Es sei an dieser Stelle angemerkt, dass sich die Nahtschlaufendichte einer Bespannung während ihres Herstellungsprozesses ändern kann. So kann es durch thermische Verfahrensschritte zu einem Schrumpf der Bespannung in Querrichtung kommen. Daher ist die Nahtschlaufendichte vor dem ersten thermischen Verfahrensschritt meist niedriger, üblicherweise zwischen 55% und 80%, während sie in der fertigen Bespannung dann höher ist. Die in dieser Anmeldung angegebenen Werte der Nahtschlaufendichte beziehen sich, soweit nicht anderweitig angegeben, auf die fertige Bespannung

In einer bevorzugten Ausführung kann vorgesehen sein, dass die Schlaufendichte der Naht zwischen 64% und 90%, insbesondere zwischen 72% und 86% beträgt. Als besonders vorteilhaft haben sich Werte von .Werte von 80%, 81%, 82%, 83%, 84% und 85% herausgestellt.

Da tendenziell die Permeabilität der Naht höher ist, als im Rest der Bespannung, kann durch eine vergleichsweise hohe Nahtschlaufendichte die Permeabilität der Naht erhöht werden. Eine Erhöhung der Schlaufendichte über 90% hinaus kann jedoch dazu führen, dass die eingangs erwähnte einfache Nahtbarkeit der Bespannung teilweise verloren geht, da es schwieriger wird, die Nahtschlaufen ineinandergreifen zu lassen. Ähnlich wie beim LD/MDYD Verhältnis ist auch der hier angeführte Bereich der Nahtschlaufendichte ein in gewissem Sinne optimaler Bereich für zwei gegenläufige Anforderungen.

In einer bevorzugten Ausführung weist die Bespannung zumindest an ihrer Papier berührenden Oberseite eine oder mehrere Lagen aus Vliesfasern auf. Insbesondere kann es sich bei der Bespannung um einen Pressfilz handeln. Zudem können auch an der Walzen berührenden Unterseite der Bespannung eine oder mehrere Lagen aus Vliesfasern vorgesehen sein.

Vorteilhafterweise ist dabei vorgesehen, dass ein Teil der Vliesfasern eine Faserfeinheit von 67dtex oder mehr aufweisen. Insbesondere können diese vergleichsweise groben Fasern in direkter Nachbarschaft zu der Grundstruktur angeordnet sein. Häufig werden sie als eine grobe Vlieslage aufgebracht und mit der Grundstruktur vernadelt.
Es können auch Vliesfasern mit einer Feinheit von 44 dtex und weniger verwendet werden. Insbesondere können diese vergleichsweise feinen Fasern an der papierberührenden Oberseite der Bespannung angeordnet sein. Diese feinen Fasern können auf einer Vlieslage mit den oben erwähnten groben Fasern mit 67 dtex oder mehr angeordnet und mit ihnen vernadelt sein.
Hierdurch kann eine gute Verbindung der Vliesauflage mit der Grundstruktur sowie der einzelnen Vlieslagen untereinander erzielt werden.

In besonders vorteilhaften Ausführungen der Erfindung können zumindest einige der Vliesfasern ein Elastomer, insbesondere ein Polyurethan umfassen oder daraus bestehen. Durch die Verwendung von Elastomeren im Faservlies kann die Bespannung nach dem Durchlauf durch den Pressnip wieder besser expandieren.

Dadurch bleibt die Entwässerungseigenschaft der Bespannung länger auf einem hohen Niveau, was für den Betreiber ökonomische Vorteile bietet. Insbesondere im Bereich der Naht und in dem bzw. den Join-Bereichen sind Vliesfasern aus Elastomer vorteilhaft. Hier ist ihre Verwendung auch deshalb vorteilhaft, weil die elastische Wirkung die Markierungstendenzen dieser Stellen weiter reduziert.

Schließlich kann in vorteilhaften Ausführungen der Bespannung auch vorgesehen sein, dass im Bereich der Naht zumindest ein streifenförmiges, strömungsbehinderndes Element vorgesehen ist, welches so eingerichtet ist, dass die Durchlässigkeit für Luft und/oder Wasser im Bereich der Naht im Wesentlichen dieselbe ist, wie in der übrigen Bespannung.
Dieses strömungsbehindernde Element kann auf verschiedene Arten realisiert sein. Beispielsweise kann es als Band aus gewebtem oder nicht gewebtem Material gebildet sein. Alternativ kann es eine Membran, eine Folie oder ein Polymerschaum sein. Das Element kann auch in Form eines gehärteten flüssigen Harzes realisiert sein Der Fachmann wird hier ohne weiteres noch auf weitere geeignete Realisierungsformen kommen können.

Im Folgenden wird die Erfindung anhand schematischer, nicht maßstäblicher Skizzen näher erläutert.

Figuren 1a bis 1c zeigen schematisch den Aufbau bzw. die Herstellung einer Grundstruktur mit einer zweilagigen Laminatstruktur zur Verwendung in einer Bespannung gemäß verschiedenen Ausführungen der Erfindung.
Figuren 2a bis 2c zeigen schematisch den Aufbau bzw. die Herstellung einer Grundstruktur mit einer zweilagigen Laminatstruktur zur Verwendung in einer Bespannung gemäß weiteren Ausführungen der Erfindung.
Figur 3 zeigt eine Bespannung nach einem Aspekt der Erfindung.
Figur 4 zeigt eine Nahtschlaufe einer Bespannung gemäß einem Aspekt der Erfindung.
Figur 5 zeigt eine mögliche Ausführung einer Fügestelle

Figur 1a zeigt ein einzelnes flachgewebtes Element 2 mit einem ersten längsseitigen Ende 21 und einem zweiten längsseitigen Ende 22. in der Draufsicht. Die Stellen 31 und 32 sind die gewählten Faltstellen 31, 32, aus denen die Nahtschlaufen 41,42 gebildet werden. Figur 1b zeigt das flachgewebte Element 2 noch einmal in einer Seitenansicht.

An den Faltstellen 31, 32 können jeweils ein oder mehrere CD Fäden entnommen werden.

Wie in Figur 1c gezeigt werden zur Herstellung der Grundstruktur das flachgewebte Element 2 an Faltstellen 31, 32 gefaltet, und die gefalteten Teile wieder auf das flachgewebte Element 2 abgelegt. So entsteht eine zweilagige Laminatstruktur 1. Die längsseitigen Enden 21, 22, können sich dabei im Bereich des Joins 20 überlappen, berühren oder, wie in Figur 1c gezeigt, einen kleinen Abstand zueinander aufweisen. Der Join 20 kann in verschiedenen Ausführungen der Erfindung als Fügestelle 200 ausgeführt sein, an der zwei längsseitige Enden 21, 22 miteinander verbunden sind. Eine vorteilhafte Fügemethode ist das Schweißen, insbesondere das Ultraschall- und das Lasertransmissionsschweißen. Zur Verbesserung der Stabilität insbesondere bei der Verarbeitung können die beiden Lagen der zweilagigen Laminatstruktur 1 an Fixierstellen 110 miteinander verbunden, insbesondere vernäht sein.

Figur 2a zeigt eine zweilagige Laminatstruktur 1, die zwei flachgewebte Elemente 2, 2a umfasst. Die Nahtschlaufen 41, 42 sind hier durch die MD-Fäden 10 des ersten flachgewebten Elements 2 gebildet. Das zweite flachgewebte Element 2a ist so angeordnet, dass sein erstes längsseitiges Ende 21a mit dem zweiten längsseitigen Ende 22 des ersten flachgewebten Elementes 2 einen Join-Bereich ausbildet, während sein zweites längsseitiges Ende 22a mit dem ersten längsseitigen Ende 21 des ersten flachgewebten Elementes 2 einen Join-Bereich ausbildet. Diese Join-Bereiche 20 können wieder als Fügestellen 200 ausgeführt sein.

Zur Verbesserung der Stabilität insbesondere bei der Verarbeitung kann das zweite flachgewebte Element 2a an Fixierstellen 110 mit dem ersten flachgewebten Element 2 verbunden, insbesondere vernäht sein.

Figur 2b zeigt eine weitere Ausführung einer zweilagigen Laminatstruktur 1, die zwei flachgewebte Elemente 2, 2a umfasst. Sie unterscheidet sich von der in Figur 2a dargestellten Struktur dadurch, dass eine Nahtschlaufe 41 durch MD-Fäden 10 des ersten flachgewebten Elements 2 gebildet wird, während die zweite Nahtschlaufe 42 durch MD-Fäden 10 des zweiten flachgewebten Elements 2a gebildet wird. Die beiden flachgewebten Elemente 2, 2a können dabei gleich, insbesondere auch gleich lang sein. Alternativ kann aber auch vorgesehen sein, dass sie sich in einem oder mehreren Merkmalen, insbesondere in der Länge, unterscheiden.

Die Figur 2c zeigt eine weitere Ausführung einer zweilagigen Laminatstruktur 1, welche drei flachgewebte Elemente 2, 2a, 2b umfasst.

Figur 3 zeigt eine Ausführung einer Bespannung nach einem Aspekt der Erfindung. Auf der zweilagige Laminatstruktur 1 aus Figur 1c sind dabei Vlieslagen 5a, 5b, 5c, 5d angebracht. Diese sind üblicherweise durch Vernadeln befestigt. Durch die Vernadelung erfolgt im Übrigen noch eine weitere Verbindung der beiden Lagen der zweilagigen Laminatstruktur 1 miteinander.

Figur 4 zeigt eine Nahtschlaufe 42, gebildet aus einem MD-Faden 10. Der MD-Faden 10 ist hier als rundes Monofilament ausgeführt. Auf der oberen Seite der Bespannung ist eine Vlieslage 15 vorgesehen. Zur Bestimmung des LD/MDYD Verhältnisses ist in die Nahtschlaufe 42 ein Kreis einbeschrieben. Dies ist der größte Kreis, welcher sich vollständig in die Nahtschlaufe 42 einfügen lässt. Die Bestimmung derartiger Kreise und deren Durchmesser ist eine geläufige geometrische Übung. Bei handelsüblichen Mikroskopen ist eine derartige Messung auch im Funktionsumfang der Bedienungssoftware enthalten. Bei den Bespannungen gemäß dieser Erfindung stehen die Nahtschlaufen auch senkrecht oder weitgehend senkrecht, so dass die Problematik einer möglichen Verzerrung nicht auftritt.
Der Durchmesser des Kreises beträgt im Falle der Figur 4 1200 µm. Der Durchmesser des MD Fadens liegt bei 340 µm. Das daraus resultierende LD/MDYD Verhältnis ist daher 1200/340=3.5. Eine Bespannung mit derartigen Nahtschlaufen erfüllt somit das Merkmal des kennzeichnenden Teils des Anspruchs 1.

In Figur 5 ist beispielhaft ein Ausschnitt aus einer Fügestelle 200 dargestellt, welche mittels Lasertransmissionsschweißen hergestellt ist. Die transparenten Fügepartner 100, 105 sind hier mittels eines Verbindungselements 120 miteinander verbunden. Das Verbindungselement 120 ist in Figur 5 exemplarisch als schwarzer Faden 120 realisiert. Bei den transparenten Fügepartnern100, 105 kann es sich beispielsweise um MD-Fäden 10 längsseitiger Enden 21, 22 einer bzw. zweier flachgewebter Elemente 2, 2a, 2b handeln. Man erkennt, dass das Verbindungselement 120 zwar durch den Schweißvorgang merklich deformiert wurde. Die transparenten Fügepartner 100, 105 sind jedoch strukturell weitgehend unbeschädigt. Aufgrund dieser Eigenschaft lassen sich mittels Lasertransmissionsschweißen hergestellte Verbindungen auch von anderen Schweißverbindungen unterscheiden.

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Patentansprüche

1. Bespannung, insbesondere Nahtfilz für eine Maschine zur Herstellung einer Faserstoffbahn, insbesondere einer Papier~, Karton~, Tissue~ oder Zellstoffbahn, umfassend eine Grundstruktur, die eine zweilagige Laminatstruktur (1) aus einem oder mehreren flachgewebten Elementen (2, 2a, 2b) umfasst oder daraus besteht, wobei die Laminatstruktur (1) MD-Fäden (10) aufweist, welche an den beiden stirnseitigen Enden der Grundstruktur Nahtschlaufen (41, 42) ausbilden und die beiden Lagen der Laminatstruktur (1) über die Nahtschlaufen (41, 42) miteinander verbunden sind, und wobei die Bespannung durch Verbinden ihrer stirnseitigen Enden mittels einer Naht endlos gemacht ist, und diese Naht durch Ineinandergreifen der Nahtschlaufen (41, 42) beider stirnseitiger Enden und das Einführen eines Steckelements ausgeführt ist, **dadurch gekennzeichnet, dass** der Durchmesser (LD) der Nahtschlaufen (41, 42) und der Durchmesser (MDYD) der zugehörigen MD-Fäden (10) ein Verhältnis LD/MDYD zwischen 2.5 und 4, insbesondere zwischen 2.7 und 3.6 aufweisen.

2. Bespannung gemäß Anspruch 1, dadurch gekennzeichnet, dass zumindest eines insbesondere alle flachgewebten Elemente (2, 2a, 2b) Flottierungen aufweisen, die sich über zwei oder mehrere Fäden erstrecken.

3. Bespannung gemäß einem der vorherigen Ansprüche, **dadurch gekennzeichnet, dass** jedes der flachgewebten Elemente (2. 2a, 2b) ein erstes und ein zweites längsseitiges Ende (21, 22, 21a, 22a) aufweist, und die zweilagige Laminatstruktur (1) zumindest eine Fügestelle (200) aufweist, an der zwei längsseitige Enden (21, 22, 21a, 22a) miteinander verbunden sind, wobei diese längsseitigen Enden (21, 22, 21a, 22a) zu demselben flachgewebten Element (2, 2a, 2b) oder zu verschiedenen flachgewebten Elementen (2, 2a, 2b) gehören können.

4. Bespannung nach Anspruch 3, **dadurch gekennzeichnet, dass** die Verbindung der zwei längsseitige Enden (21, 22, 21a, 22a) durch eine Schweißverbindung,

insbesondere eine mittels Lasertransmissionsschweißen erzeugte Schweißverbindung realisiert ist.

5. Bespannung nach einem der Ansprüche 3 oder 4, **dadurch gekennzeichnet, dass** die Ausdehnung der zumindest einen Fügestelle (200) in Maschinenrichtung (MD) weniger als 15mm, insbesondere weniger als 5mm beträgt.

6. Bespannung nach einem der Ansprüche 3 bis 5, **dadurch gekennzeichnet, dass** die zumindest eine Fügestelle (200) durch Verbindungselemente (120), insbesondere Verbindungsfäden (120) realisiert ist, welche mit zumindest einem, vorzugsweise beiden längsseitigen Enden (21, 22, 21a, 22a) verschweißt sind.

7. Bespannung nach Anspruch 6, **dadurch gekennzeichnet, dass** als Verbindungselemente (120) Verbindungsfäden (120) verwendet sind, welche in CD-Richtung der Bespannung angeordnet sind, wobei für eine Fügestelle (200) maximal drei Verbindungsfäden (120), insbesondere maximal zwei Verbindungsfäden (120) vorgesehen sind.

8. Bespannung nach Anspruch 7, **dadurch gekennzeichnet, dass** eine oder mehrere der Verbindungsfäden (120) mit MD-Fäden (10) zumindest eines längsseitigen Endes (21, 22, 21a, 22a) verwoben sind.

9. Bespannung nach einem der vorherigen Ansprüche, **dadurch gekennzeichnet, dass** die MD-Fäden (10) als Monofilamente, insbesondere als Monofilamente mit rundem Querschnitt ausgeführt sind.

10. Bespannung nach einem der vorherigen Ansprüche, **dadurch gekennzeichnet, dass** der Durchmesser der MD-Fäden (10) zwischen 0.15mm und 0.7mm, insbesondere zwischen 0.3mm und 0.5mm beträgt.

11. Bespannung nach einem der vorigen Ansprüche, **dadurch gekennzeichnet, dass** die Schlaufendichte der Naht zwischen 64% und 90%, insbesondere zwischen 72% und 86% beträgt.

12. Bespannung nach einem der vorherigen Ansprüche, **dadurch gekennzeichnet, dass** die Bespannung zumindest an ihrer Papier berührenden Oberseite eine oder mehrere Lagen (5a, 5b, 5c, 5d) aus Vliesfasern aufweist.

13. Bespannung nach Anspruch 12, **dadurch gekennzeichnet, dass** zumindest einige der Vliesfasern ein Elastomer, insbesondere ein Polyurethan umfassen oder daraus bestehen.

14. Bespannung nach einem der vorherigen Ansprüche, **dadurch gekennzeichnet, dass** im Bereich der Naht zumindest ein streifenförmiges, strömungsbehinderndes Element vorgesehen ist, welches so eingerichtet ist, dass die Durchlässigkeit für Luft und/oder Wasser im Bereich der Naht im Wesentlichen dieselbe ist, wie in der übrigen Bespannung.

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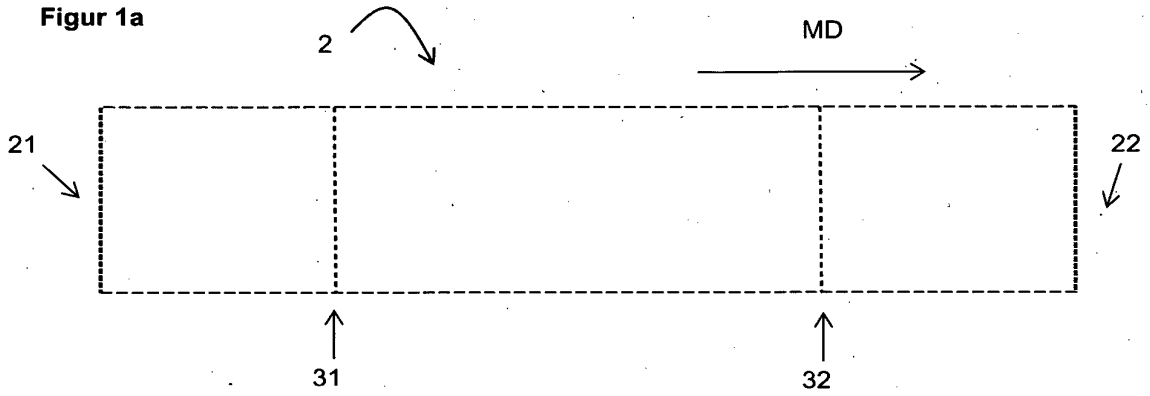
Zusammenfassung

Bespannung, insbesondere Nahtfilz für eine Maschine zur Herstellung einer Faserstoffbahn, insbesondere einer Papier~, Karton~, Tissue~ oder Zellstoffbahn, umfassend eine Grundstruktur, die eine zweilagige Laminatstruktur aus einem oder mehreren flachgewebte Elemente umfasst oder daraus besteht, wobei die Laminatstruktur MD-Fäden aufweist, welche an den beiden stirnseitigen Enden der Grundstruktur Nahtschlaufen ausbilden und die beiden Lagen der Laminatstruktur über die Nahtschlaufen miteinander verbunden sind, und wobei die Bespannung durch Verbinden ihrer stirnseitigen Enden mittels einer Naht endlos gemacht ist, und diese Naht durch Ineinandergreifen der Nahtschlaufen beider stirnseitiger Enden und das Einführen eines Steckelements ausgeführt ist. Erfindungsgemäß ist vorgesehen, dass der Durchmesser der Nahtschlaufen (LD) und der Durchmesser der zugehörigen MD-Fäden (MDYD) ein Verhältnis LD/MDYD zwischen 2.5 und 4, insbesondere zwischen 2.7 und 3.6 aufweisen.

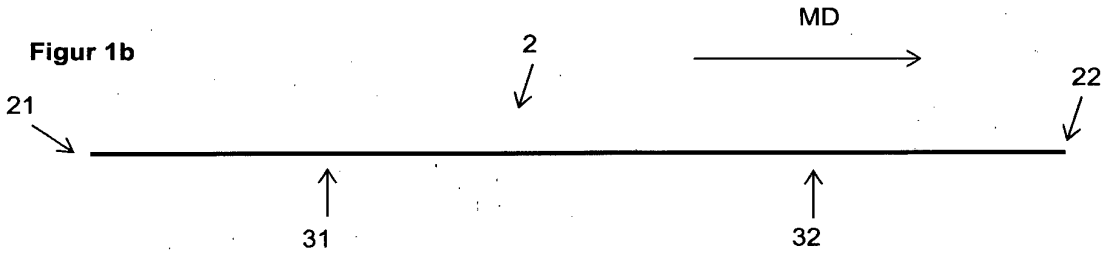
(Figur 4)

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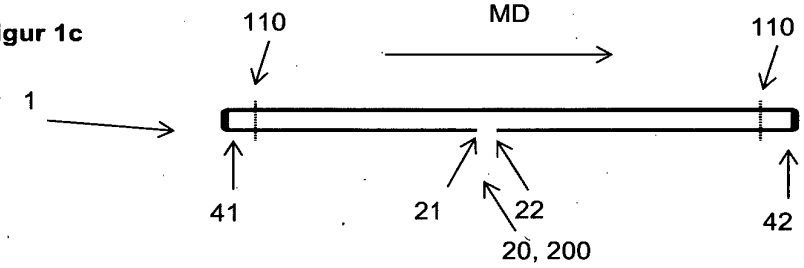
Figur 1a



Figur 1b

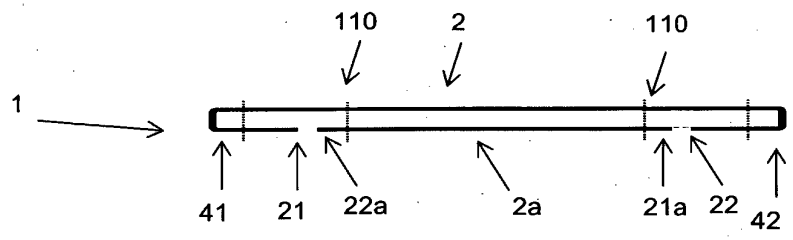


Figur 1c

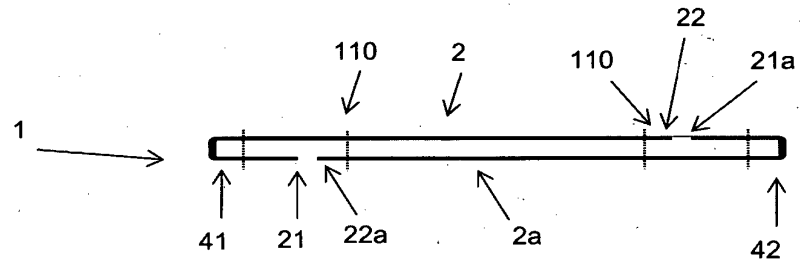


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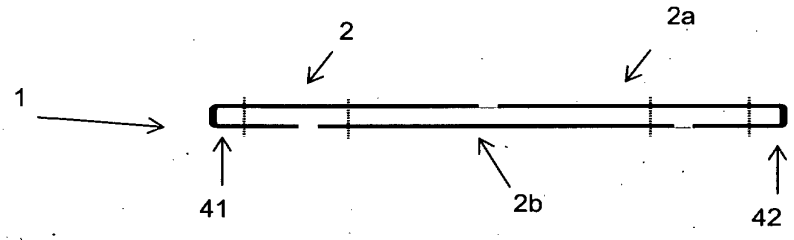
Figur 2a



Figur 2b

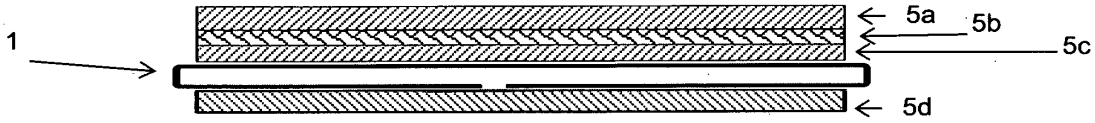


Figur 2c

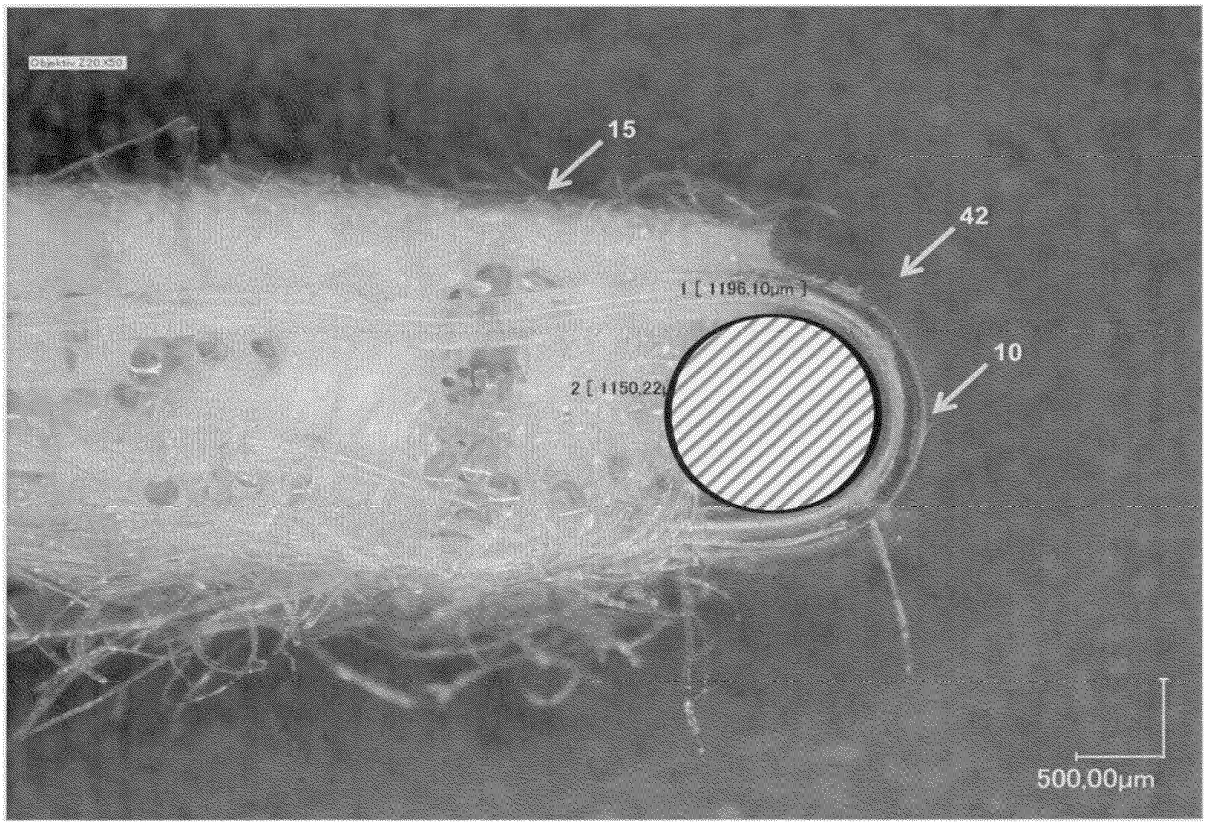


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Figur 3

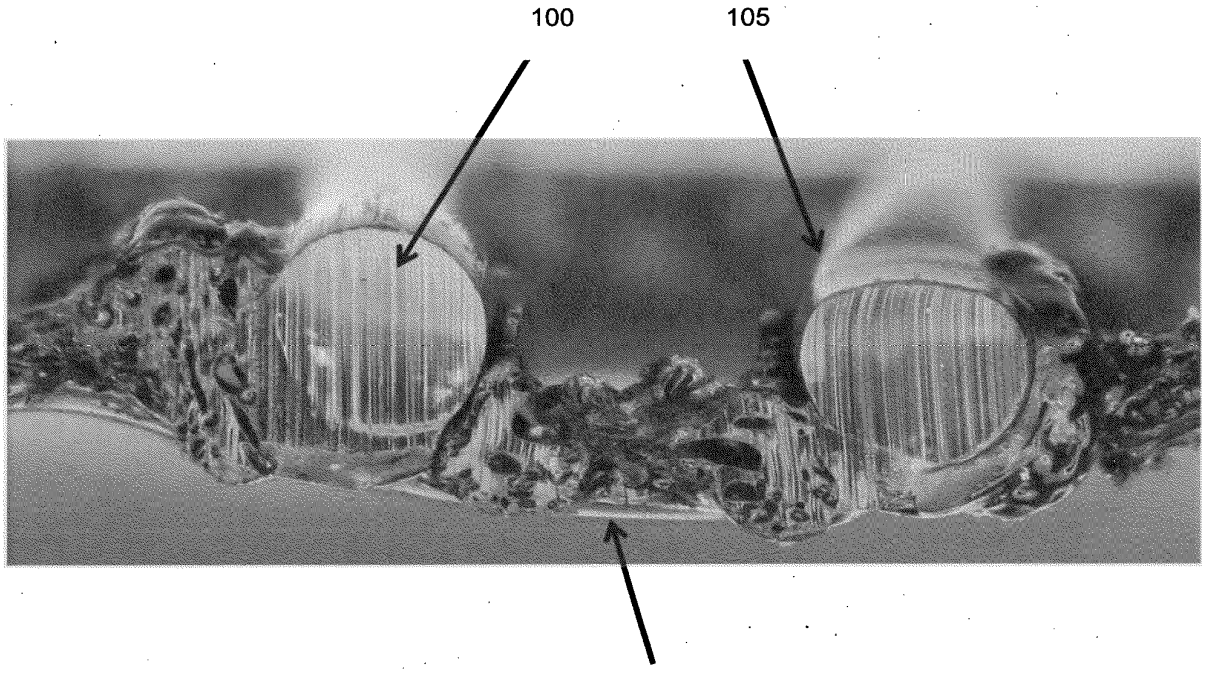


Figur 4



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Figur 5



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DOCUMENT MADE AVAILABLE UNDER THE PATENT COOPERATION TREATY (PCT)

International application number:		**PCT/EP2019/055955**
International filing date:		**11 March 2019 (11.03.2019)**
Document type:		**Certified copy of priority document**
Document details:	Country/Office:	**DE**
	Number:	**10 2018 105 956.6**
	Filing date:	**15 March 2018 (15.03.2018)**
Date of receipt at the International Bureau:		**03 April 2019 (03.04.2019)**

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a),(b) or (b-*bis*)

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DocCode – SCORE

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TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A SUBMISSION UNDER 35 U.S.C. 371

Attorney Docket No.	
VP-22858	
U.S. Application No. (if known, see 37 CFR 1.5)	

International Application No.	International Filing Date	Priority Date Claimed
PCT/EP2019/055955	2019-03-11	2018-03-15

Title of Invention
CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB

First Named Inventor
EBERHARDT, Robert

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information.

1. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). NOTE: The express request under 35 U.S.C. 371(f) will not be effective unless the requirements under 35 U.S.C. 371(c)(1), (2), and (4) for payment of the basic national fee, copy of the International Application and English translation thereof (if required), and the oath or declaration of the inventor(s) have been received.
2. ☒ A copy of the International Application (35 U.S.C. 371(c)(2)) is attached hereto (not required if the International Application was previously communicated by the International Bureau or was filed in the United States Receiving Office (RO/US)).
3. An English language translation of the International Application (35 U.S.C. 371(c)(2))
   a. ☒ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
4. An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4))
   a. ☒ is attached.
   b. ☐ was previously filed in the international phase under PCT Rule 4.17(iv).

Items 5 to 8 below concern amendments made in the international phase.

PCT Article 19 and 34 amendments

5. ☐ Amendments to the claims under PCT Article 19 are attached (not required if communicated by the International Bureau) (35 U.S.C. 371(c)(3)).
6. ☐ English translation of the PCT Article 19 amendment is attached (35 U.S.C. 371(c)(3)).
7. ☐ English translation of annexes (Article 19 and/or 34 amendments only) of the International Preliminary Examination Report is attached (35 U.S.C. 371(c)(5)).

Cancellation of amendments made in the international phase

8a. ☐ Do not enter the amendment made in the international phase under PCT Article 19.

8b. ☐ Do not enter the amendment made in the international phase under PCT Article 34.

NOTE: A proper amendment made in English under Article 19 or 34 will be entered in the U.S. national phase application absent a clear instruction from applicant not to enter the amendment(s).

The following items 9 to 17 concern a document(s) or information included.

9. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
10. ☒ A preliminary amendment.
11. ☒ An Application Data Sheet under 37 CFR 1.76.
12. ☐ A substitute specification. NOTE: A substitute specification cannot include claims. See 37 CFR 1.125(b).
13. ☒ A power of attorney and/or change of address letter.
14. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13*ter*.3 and 37 CFR 1.821-1.825 (not required if sequence listing in text format was indicated on the PCT Request as part of the International Application and the sequence listing was published as part of the international application).
15. ☐ Assignment papers *(cover sheet and document(s))*. Name of Assignee: _____
16. ☐ 37 CFR 3.73(c) Statement *(when there is an Assignee)*.

This collection of information is required by 37 CFR 1.414 and 1.491-1.492. 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 1.11 and 1.14. This collection is estimated to take 15 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: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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U.S. APPLN. No. (if known – see 37 CFR 1.5)	INTERNATIONAL APPLICATION No.	ATTORNEY DOCKET No.
	PCT/EP2019/055955	VP-22858

17. [X] Other items or information:

CHARGE AUTHORIZATION, CERTIFICATION OF TRANSLATION

The following fees have been submitted.	CALCULATIONS
18. [■] Basic national fee (37 CFR 1.492(a)) **$300**	$ 300.00
19. [■] Examination fee (37 CFR 1.492(c)) • If the written opinion prepared by ISA/US or the international preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4)..... **$0** • All other situations **$760**	$ 760.00
20. [■] Search fee (37 CFR 1.492(b)) • If the written opinion prepared by ISA/US or the international preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4)..... **$0** • Search fee (37 CFR 1.445(a)(2)) has been paid on the international application to the USPTO as an International Searching Authority ..... **$140** • International Search Report prepared by an ISA other than the US and provided to the Office or previously communicated to the US by the IB..... **$520** • All other situations **$660**	$ 520.00
TOTAL OF 18, 19, and 20 =	$ 1580.00
[ ] Additional fee for specification and drawings filed in paper over 100 sheets (excluding sequence listing in compliance with 37 CFR 1.821(c) or (e) in an electronic medium or computer program listing in an electronic medium) (37 CFR 1.492(j)). Fee for each additional 50 sheets of paper or fraction thereof **$400**	

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof (round **up** to a whole number)	RATE	
- 100 =	/ 50 =		x **$400**	$

Surcharge for furnishing any of the search fee, examination fee, or the oath or declaration after the date of commencement of the national stage (37 CFR 1.492(h))..... **$140**	$

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	- 20 =		x **$100**	$
Independent claims	- 3 =		x **$460**	$
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			**+ $820**	$

Fee for submission of Sequence Listing text file of 300 MB to 800 MB (37 CFR 1.21(o)(1))..... **$1,000**	$
Fee for submission of Sequence Listing text file of more than 800 MB (37 CFR 1.21(o)(2))..... **$10,000**	$
Processing fee for furnishing the English translation later than 30 months from the earliest claimed priority date (37 CFR 1.492(i))..... **$140 +**	$
TOTAL OF ABOVE CALCULATIONS =	$ 1580.00
[ ] **Applicant asserts small entity status.** See 37 CFR 1.27. Fees above are reduced by ½.	
[ ] **Applicant certifies micro entity status.** See 37 CFR 1.29. Fees above are reduced by ¾. Applicant must attach form PTO/SB/15A or B or equivalent.	
TOTAL NATIONAL FEE =	$ 1580.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31)..... **$50.00** per property **+**	$
TOTAL FEES ENCLOSED =	$ 1580.00

a. ☐ A check in the amount of $_____ to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of $_____ to cover the above fees.

c. ☒ The Director is hereby authorized to charge additional fees which may be required, or credit any overpayment, to Deposit Account No. 12-1099 as follows:

i. ☒ any required fee.

ii. ☐ any required fee except for excess claims fees required under 37 CFR 1.492(d) and (e) and multiple dependent claim fee required under 37 CFR 1.492(f).

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NOTE: Where an appropriate time limit under 37 CFR 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the International Application to pending status.

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013, and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.

NOTE 1: By providing this statement under 37 CFR 1.55 or 1.78, **this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA**.

NOTE 2: A U.S. national stage application may not claim priority to the international application of which it is the national phase. The filing date of a U.S. national stage application is the international filing date. See 35 U.S.C. 363.

Correspondence Address

☒ The address associated with Customer Number: 24131 **OR** ☐ Correspondence address below

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Address					
City		State		Zip Code	
Country		Telephone			
Email					

Signature	/LAURENCE A. GREENBERG/	Date	2020-09-10
Name (Print/Type)	LAURENCE A. GREENBERG	Registration No. (Attorney/Agent)	29308

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	VP-22858
	Application Number	
Title of Invention	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	ROBERT		EBERHARDT	

Residence Information (Select One) US Residency ● Non US Residency Active US Military Service

City	ELLWANGEN	Country of Residence [i]	DE

Mailing Address of Inventor:

Address 1	BARBARA-STECH-WEG 19
Address 2	

City	ELLWANGEN	State/Province	
Postal Code	73479	Country [i]	DE

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	SUSANNE		KLASCHKA	

Residence Information (Select One) US Residency ◉ Non US Residency Active US Military Service

City	KOELN	Country of Residence [i]	DE

Mailing Address of Inventor:

Address 1	SUELZBURGSTR. 36
Address 2	

City	KOELN	State/Province	
Postal Code	50937	Country [i]	DE

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

PTO/AIA/14 (02-18)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	VP-22858
	Application Number	
Title of Invention	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB	

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	24131		
Email Address	office@patentusa.com	Add Email	Remove Email

Application Information:

Title of the Invention	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB		
Attorney Docket Number	VP-22858	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	4	**Suggested Figure for Publication (if any)**	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	24131		

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	VP-22858
	Application Number	
Title of Invention	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB	

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	a 371 of international	PCT/EP2019/055955	2019-03-11

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
102018105956	DE	2018-03-15	

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	VP-22858
	Application Number	
Title of Invention	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	VP-22858
	Application Number	
Title of Invention	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 — Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

● Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	VOITH PATENT GMBH		
Mailing Address Information For Applicant:			
Address 1			
Address 2			
City	HEIDENHEIM	**State/Province**	
Country	DE	Postal Code	89522
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	VP-22858
	Application Number	
Title of Invention	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/LAURENCE A. GREENBERG/			Date (YYYY-MM-DD)	2020-09-10
First Name	LAURENCE	Last Name	GREENBERG	Registration Number	29308

Additional Signature may be generated within this form by selecting the Add button. Add

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Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	VP-22858
	Application Number	
Title of Invention	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB	

This collection of information is required by 37 CFR 1.76. 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 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Doc Code: PA..
Document Description: Power of Attorney

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TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	TBD
Filing Date	TBD
First Named Inventor	Robert, EBERHARDT, et al.
Title	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB
Art Unit	N/A
Examiner Name	N/A
Attorney Docket Number	VP-22858

SIGNATURE of Applicant or Patent Practitioner

Signature	/LAURENCE A. GREENBERG/	Date (Optional)	2020/09/10
Name	LAURENCE A. GREENBERG	Registration Number	29308
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ *Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. 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 1.11 and 1.14. This collection is estimated to take 3 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.

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82B (07-13)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☑ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 24131

OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

☑ The address associated with the above-mentioned Customer Number

OR

☐ The address associated with Customer Number:

OR

Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

VOITH PATENT GMBH

☐ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☑ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature	Roland Mayer	Date (Optional)	2017-01-24
Name	Roland Mayer		
Title	Principal Officer		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ Total of forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. 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 1.11 and 1.14. This collection is estimated to take 3 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.

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB
First Named Inventor/Applicant Name:	ROBERT EBERHARDT
Filer:	Laurence Arnold Greenberg/Raffaela Smith
Attorney Docket Number:	VP-22858

Filed as Large Entity

Filing Fees for U.S. National Stage under 35 USC 371

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
NATIONAL STAGE FEE	1631	1	300	300
NATL STAGE SEARCH FEE - REPORT PROVIDED	1642	1	520	520
NATIONAL STAGE EXAM - ALL OTHER CASES	1633	1	760	760
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1580**

Electronic Acknowledgement Receipt	
EFS ID:	40527814
Application Number:	16980449
International Application Number:	PCT/EP2019/055955
Confirmation Number:	1867
Title of Invention:	CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB
First Named Inventor/Applicant Name:	ROBERT EBERHARDT
Customer Number:	24131
Filer:	Laurence Arnold Greenberg/Michelle Janca
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		VP-22858-Prelf.pdf	38018 589690af34b961fadd850f91bcba1c208d439698	yes	9

Multipart Description/PDF files in .zip description

Document Description	Start	End
Preliminary Amendment	1	1
Specification	2	3
Abstract	4	4
Claims	5	8
Applicant Arguments/Remarks Made in an Amendment	9	9

Warnings:					
Information:					
2	Drawings-only black and white line drawings	VP-22858-Drawings.pdf	226949 140d4cb31f1e449cd5ea8cd8cb768bcacaf8f1bc	no	4
Warnings:					
Information:					
3	Transmittal of New Application	VP-22858-Certification-Translation.pdf	12030 24081397c7ff289b12bedc763e62a7e3efb3ed92	no	1
Warnings:					
Information:					
4		VP-22858-Translation.pdf	95714 66bd1219d493dee01923764e038604c2f5a83ba3	yes	21

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Specification	1	18
	Claims	19	21

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5	Documents submitted with 371 Applications	VP-22858-WO.pdf	2367745 c5a1d4b245c92d4ca26be4855b823923ccc6855f	no	29
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6	Authorization for Extension of Time all replies	VP-22858-Charge-Authorization.pdf	9179 2b2ddc946119ce0fd541968486c2e60027ac69e6	no	1
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8	Information Disclosure Statement (IDS) Form (SB08)	VP-22858-IDS.pdf	612335 4a20e43d1dee878d68a01e232f248b010c303032	no	4
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9	Foreign Reference	EP3196357A1.pdf	1531054 175b04282ab53295c654ff8999c17abcd2e54857a	no	27
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12	Other Reference-Patent/App/Search documents	ISR-EN.pdf	198780 525f6bbd1e51632ec4820170b68826bb28f3d5f4	no	2
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13	Transmittal of New Application	VP-22858-371-Transmittal.pdf	296895 b0089d2e9c8c7a52434f12511483eac09bea50b0	no	4
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14	Application Data Sheet	VP-22858-ADS.pdf	1256340 68eb5c07ec8d8b5c08df3610c49f543a7e3cc315	no	8
Warnings:					
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15		VP-22858-Transmittal-POA.pdf	303432 1d62f54becdaeab34dfc4565153e7dfa0b5fb3a0	yes	2
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Docket No.: VP-22858

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	PCT/EP2019/055955
Inventor	:	EBERHARDT, Robert, et al.
Int'l Filing Date	:	March 11, 2019
Docket No.	:	VP-22858
Customer No.	:	24131

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

PRELIMINARY AMENDMENT

Preliminary to examination, kindly amend the above-identified application as follows:

- Amendments to the Specification begin on page 2 of this paper.
- A new Abstract appears on a separate sheet, page 4.
- Amendments to the Claims are reflected in the listing of claims, which begins on page 5 of this paper.
- Remarks begin on page 9 of this paper.

AMENDMENTS TO THE SPECIFICATION

Page 1, between lines 2 and 3, insert:

-- BACKGROUND OF THE INVENTION

Field of the Invention: --.

Page 1, lines 3-5, replace the paragraph with the following amended paragraph:

The invention relates to a clothing, in particular a seam felt, for a machine for producing a fibrous material web ~~according to the preamble of claim 1~~, in particular a paper, board, tissue or pulp web, comprising a base structure which includes or is formed of a two-layer laminate structure formed from one or more flat-woven fabrics, the laminate structure has MD threads which form seam loops at the two end sides of the base structure, the two layers of the laminate structure are connected to each other by the seam loops, the clothing is made endless by connecting its end sides by a seam, and the seam is made by interengaging the seam loops of the two end sides and the insertion of an insertion element.

Page 2, between lines 25 and 26, insert:

-- SUMMARY OF THE INVENTION --.

Page 2, lines 30-31, replace the paragraph with the following amended paragraph:

This object is completely achieved by a clothing ~~as claimed in the characterizing part of claim 1~~ in which the diameter (LD) of the seam loops

and the diameter (MDYD) of the associated MD threads has a ratio LD/MDYD between 2.5 and 4, in particular between 2.7 and 3.6.

Page 14, between lines 27 and 28, insert:

-- BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING --.

Page 15, between lines 7 and 8, insert:

-- DETAILED DESCRIPTION OF THE INVENTION --.

Page 17, lines 14-18, replace the paragraph with the following amended paragraph:

The diameter of the circle in the case of figure 4 is 1200 µm. The diameter of the MD thread is around 340 µm. The resultant LD/MDYD ratio is therefore 1200/340 = 3.5. A clothing having such seam loops thus fulfills the feature ~~of the characterizing part of claim 1~~ in which the diameter LD of the seam loops 41, 42 and the diameter MDYD of the associated MD threads 10 has a ratio LD/MDYD between 2.5 and 4, in particular between 2.7 and 3.6.

ABSTRACT OF THE DISCLOSURE

A clothing, in particular a seam felt for a machine for producing a fibrous material web, in particular a paper, paperboard, tissue or pulp web, includes a base structure including or being formed of a two-layer laminate structure formed of one or more flat-woven fabrics. The laminate structure has MD threads which form seam loops at the two end sides of the base structure, and the two layers of the laminate structure are connected to one another by the seam loops. The clothing is made endless by connecting the end sides thereof by a seam. The seam is made by interengaging the seam loops of both end sides and introducing an insertion element. The diameter of the seam loops LD and the diameter of the associated MD threads MDYD have a ratio LD/MDYD of between 2.5 and 4, in particular between 2.7 and 3.6.

AMENDMENTS TO THE CLAIMS

Listing of Claims:

Claims 1-14 (canceled).

Claim 15 (new). A clothing or a seam felt for a machine for producing a fibrous material, paper, board, tissue or pulp web, comprising:

a base structure including or being formed of a two-layer laminate structure formed of one or a plurality of flat-woven fabrics, said base structure having two end sides;

said laminate structure having MD threads forming seam loops at said two end sides of said base structure, said seam loops interconnecting said two layers of said laminate structure, said seam loops having a diameter LD and said associated MD threads having a diameter MDYD;

a seam interconnecting said end sides to make the clothing endless, said seam being formed by interengaging said seam loops of said two end sides and an insertion of an insertion element; and

said diameter LD of said seam loops and said diameter MDYD of said associated MD threads having a ratio LD/MDYD of between 2.5 and 4.

Claim 16 (new). The clothing according to claim 15, wherein said ratio LD/MDYD of said diameter LD of said seam loops and said diameter MDYD of said associated MD threads is between 2.7 and 3.6

Claim 17 (new). The clothing according to claim 15, wherein at least one of said flat-woven fabrics have floats extending over two or a plurality of threads.

Claim 18 (new). The clothing according to claim 15, wherein each of said flat-woven fabrics has a first and a second long-side end, said two-layer laminate structure has at least one joint at which two of said long-side ends are interconnected, and said interconnected long-side ends belong to an identical flat-woven fabric or to different flat-woven fabrics.

Claim 19 (new). The clothing according to claim 18, wherein said two long-side ends are interconnected by a welded connection or a laser transmission welded connection.

Claim 20 (new). The clothing according to claim 18, wherein said at least one joint has an extent in a machine direction of less than 15 mm.

Claim 21 (new). The clothing according to claim 20, wherein said extent of said at least one joint in the machine direction is less than 5 mm.

Claim 22 (new). The clothing according to claim 18, wherein said at least one joint is made by connecting elements or connecting threads being welded to at least one or both of said long-side ends.

Claim 23 (new). The clothing according to claim 22, wherein said connecting elements are connecting threads disposed in a CD direction of the clothing, and at

most three connecting threads or at most two connecting threads are provided for a joint.

Claim 24 (new). The clothing according to claim 23, wherein one or a plurality of said connecting threads are woven with MD threads of at least one of said long-side ends.

Claim 25 (new). The clothing according to claim 15, wherein said MD threads are monofilaments or monofilaments with a round cross section.

Claim 26 (new). The clothing according to claim 15, wherein said diameter of said MD threads is between 0.15 mm and 0.7 mm.

Claim 27 (new). The clothing according to claim 26, wherein said diameter of said MD threads is between 0.3 mm and 0.5 mm.

Claim 28 (new). The clothing according to claim 15, wherein said seam has a loop density of between 64% and 90%.

Claim 29 (new). The clothing according to claim 28, wherein said loop density of said seam is between 72% and 86%.

Claim 30 (new). The clothing according to claim 15, which further comprises one or a plurality of layers of nonwoven fibers disposed at least on an upper side of the clothing for contacting the web.

Claim 31 (new). The clothing according to claim 30, wherein at least some of said nonwoven fibers include or are formed of an elastomer or a polyurethane.

Claim 32 (new). The clothing according to claim 15, which further comprises at least one strip-shaped flow-impeding element provided in a vicinity of said seam, said at least one strip-shaped flow-impeding element being configured to cause a permeability for at least one of air or water in said vicinity of said seam to be substantially identical to a remainder of the clothing.

REMARKS

This Preliminary Amendment is being filed in an effort to present an application in proper U.S. format and to present claims in proper U.S. claim idiom for examination.

The newly entered claims are fully supported in the original claims filed in the international application.

An early action on the merits is requested.

Respectfully submitted,

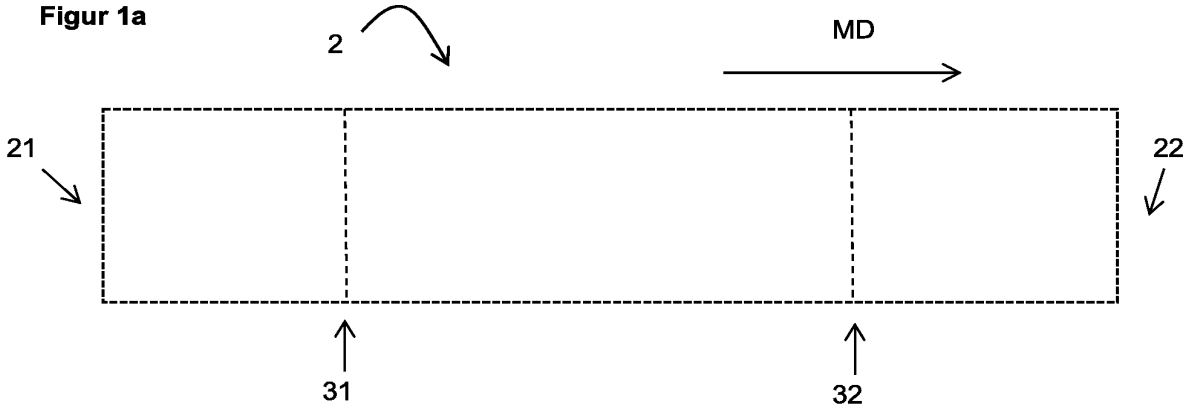
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September 10, 2020

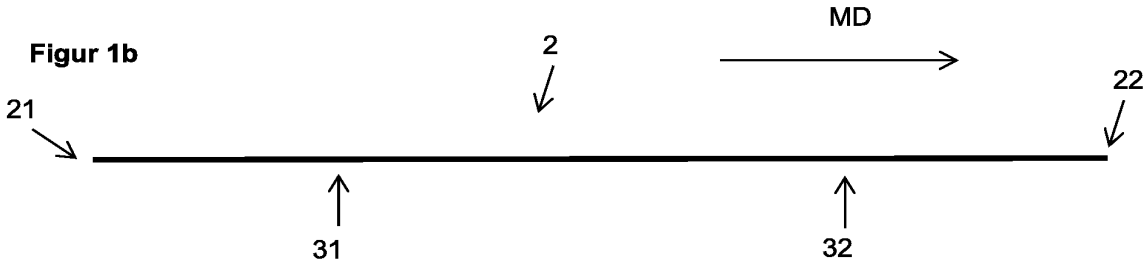
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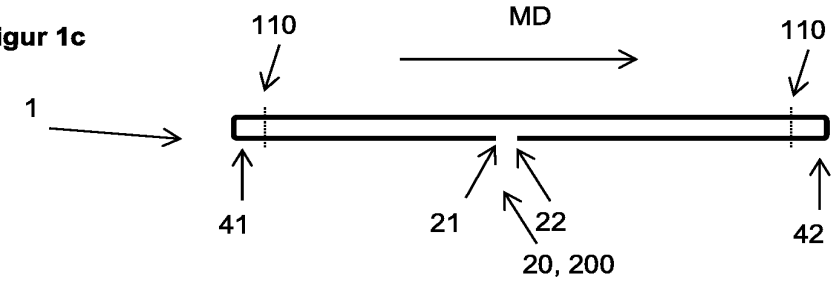
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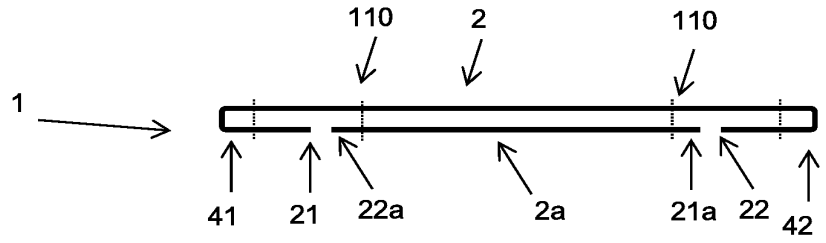
Figur 1b



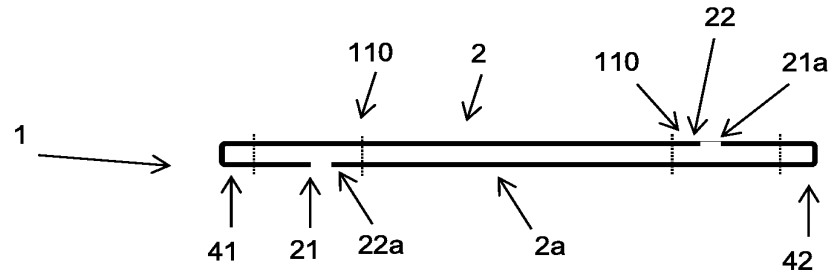
Figur 1c



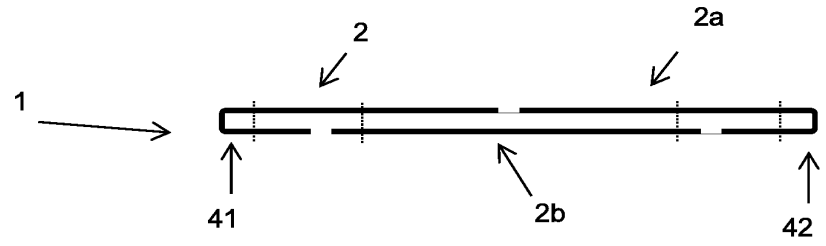
Figur 2a



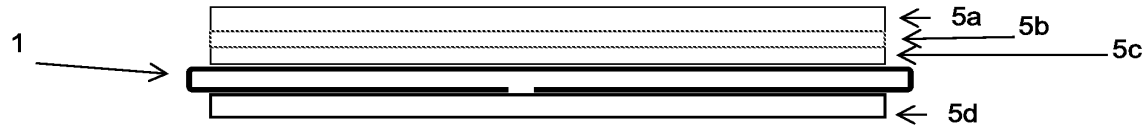
Figur 2b



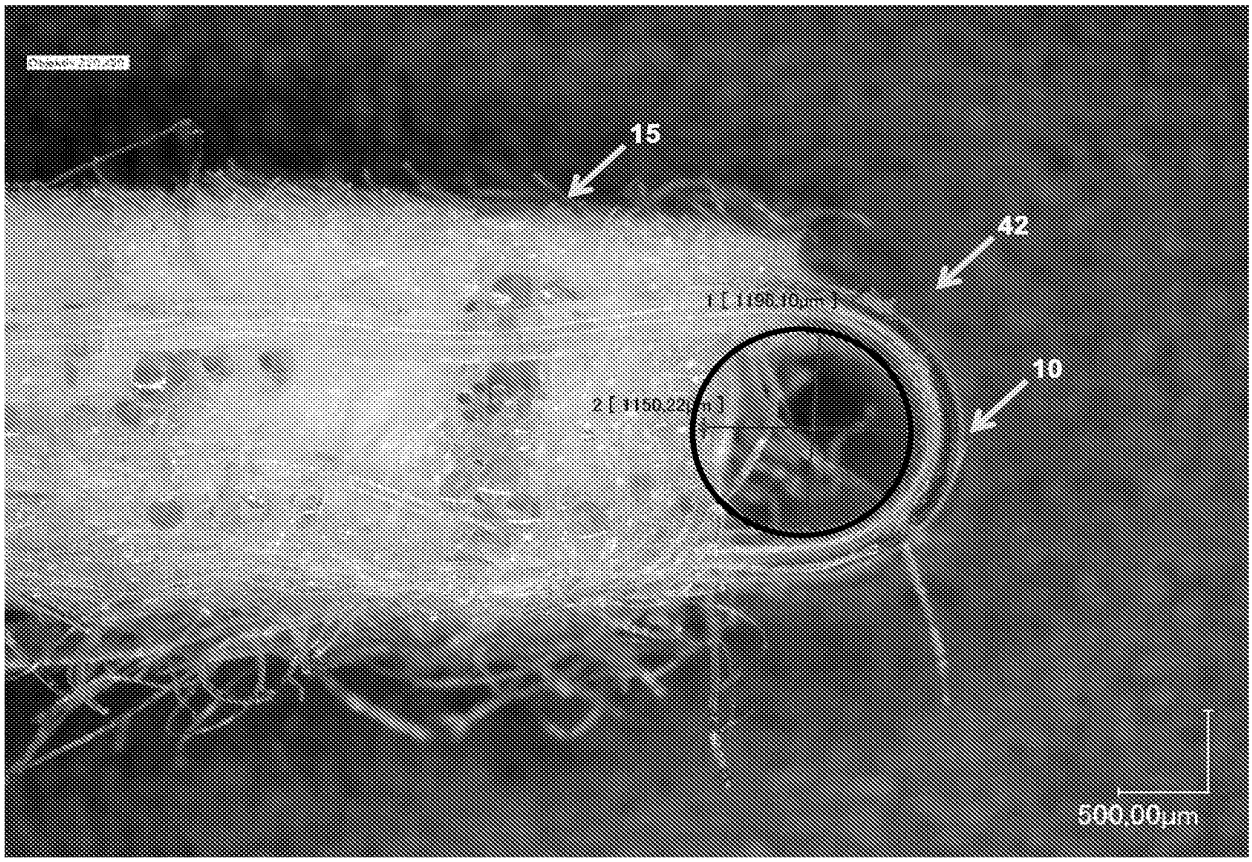
Figur 2c



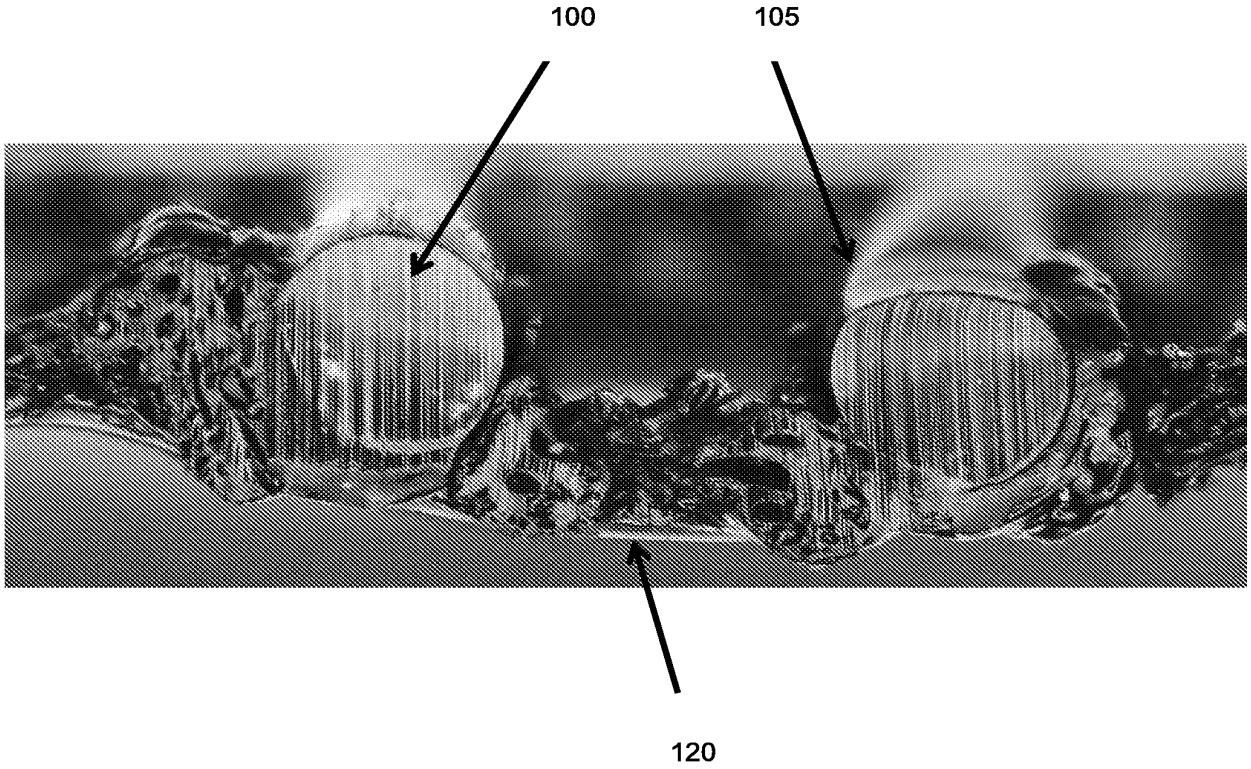
Figur 3



Figur 4



Figur 5



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First Named Inventor	Robert Eberhardt et al.
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Attorney Docket Number	VP-22858

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	2	3196357	EP	A1	2017-07-26	Ogiwara	Published in English	

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	Filing Date	
	First Named Inventor	Robert Eberhardt et al.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	VP-22858

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Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

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The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

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A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Laurence A. Greenberg/	Date (YYYY-MM-DD)	2020-09-10
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(11) EP 3 196 357 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
26.07.2017 Bulletin 2017/30

(51) Int Cl.:
D21F 7/10 *(2006.01)*

(21) Application number: **17151975.4**

(22) Date of filing: **18.01.2017**

(84) Designated Contracting States:
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Designated Extension States:
BA ME
Designated Validation States:
MA MD

(30) Priority: **20.01.2016 JP 2016008901**

(71) Applicant: **Ichikawa Co., Ltd.**
Tokyo 113-0033 (JP)

(72) Inventor: **OGIWARA, Yasuyuki**
Tokyo, 113-0033 (JP)

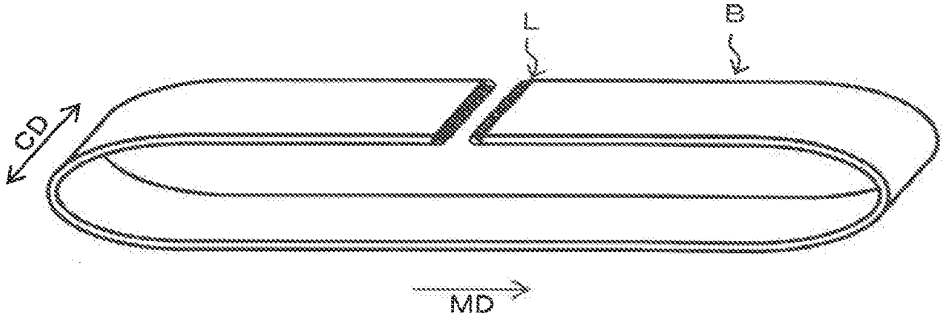
(74) Representative: **Dr. Gassner & Partner mbB**
Marie-Curie-Str. 1
91052 Erlangen (DE)

(54) BASE FABRIC FOR A PAPERMAKING FELT HAVING SEAM LOOPS AND A METHOD OF PRODUCING THE SAME

(57) The object is to provide a base fabric for a papermaking felt wherein there is no damage to the MD yarns of the seam loops and a method of producing the same.

This is achieved by a base fabric for a papermaking felt wherein seam loops are formed by MD yarns, which is made from MD yarns of the felt running direction (MD) and CD yarns of the felt cross-direction (CD); wherein the seam loops are obtained by removing CD yarns from a part other than the CD yarn no-removal part of a woven fabric comprising a seam loop region having the CD yarn no-removal part, and by moving CD yarns of the CD yarn no-removal part and CD yarns from between the CD yarn no-removal part and the part in which the CD yarns have been removed in the direction of the part in which the CD yarns have been removed, and wherein the strength of the MD yarns of the part in which the CD yarns have been removed is lower than the strength of the MD yarns of the CD yarn no-removal part.

Fig. 5



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Description

Technical Field

[0001] The present invention relates to a base fabric for a papermaking felt having seam loops and to a method of producing the same.

Description of the Related Art

[0002] Traditionally, the wet paper web is dewatered by a press felt and a pair of press rolls or by a press roll and a shoe press in the press part of a papermaking machine. As press felt, an open-ended felt having a seam loop as shown in Fig. 1 is known. In other words, the felt F is formed as an open-ended felt wherein a plurality of seam loops L are formed at each end. The felt F is, for example, formed by a base fabric B made of a woven fabric and two batt layers W, as shown in Fig. 2. The batt layer W is intertwiningly integrated together with the base fabric B by needle punching web fibers of short fibers layered on the base fabric B. The base fabric B is made of a woven fabric which is woven from yarns in the felt running direction (MD) of the felt and yarns in the cross-felt direction (CD) of the felt. The seam loops L are formed by the yarns of the felt running direction (MD).

[0003] When the felt is used, the open-ended felt F is installed in a papermaking machine, the two ends in the running direction (MD) of the felt are matched with each other, the seam loops of one end are fitted between the seam loops of the other end, and the seam loops of both ends are engaged with each other. When the seam loops are engaged, instead of directly matching them with each other from the front, the seam loops are engaged with each other after matching both ends in the form of a ridge as shown in Fig. 2 (A). Consequently, when the seam loops of one end are fitted between the seam loops of the other end, the former seam loops are joined between the seam loops of the other end from the bottom to the top. Moreover, a dedicated jig is used for engaging the seam loops.

[0004] When the engaging operations are completed, a tunnel is formed by the holes of the continuous seam loops L, and a core wire S is inserted into the group of seam loop holes in the form of a tunnel, as shown in Fig. 2 (B). Then, the endless felt F is formed in the papermaking machine by flattening the ends that were matched in the form of a ridge. This type of felt F is a so-called felt with seam loops (seam felt), which has come increasingly into use in recent years because its installation in papermaking machines is very good (for example Patent Document 1).

[0005] The felt F has a cross-felt direction (CD) width and the felt running direction (MD) length. When the felt F is formed from an open-ended shape into an endless shape, the outer circumferential surface of the felt is the surface contacting the wet paper web and the inner circumferential surface of the felt is the surface contacting the press roll. Moreover, the outer circumferential surface and the inner circumferential surface are both intertwiningly integrated with the base fabric by needle punching the batt layers W, and thus form the front and rear of the felt.

[0006] Next, the constitution of the base fabric B will be explained by referring to Figs 3 and 4. Fig. 3 is a schematic illustration of one end of the base fabric B. In Fig. 3, the base fabric B is formed by CD yarns 1 in the cross-felt direction (CD) and MD yarns 2 in the felt running direction (MD). Fig. 3 is a 1/3 warp double weave structure, and Fig. 4 is a 1/2 warp double weave structure. Moreover, it goes without saying, that the weave structures are not limited thereby and that any embodiment may be selected.

[0007] The MD yarns 2 form a pair of upper and lower yarns by folding the yarns back at the ends. In other words, in this case, the parallel MD yarns 2 form layers with each other, and the base fabric B is formed by the continuous yarn surfaces in each layer. Here, the portion of the MD yarn 2 protruding beyond the endmost portion of the CD yarn 1 forms the seam loops L at the folded back portion of the MD yarn 2.

[0008] The base fabric B is a fabric woven in endless shape, or it is made into an endless shape by joining both ends of an open-ended woven fabric.

[0009] In the following needle punching step, the base fabric B is completed as an endless felt by intertwiningly integrating the batt layers W forming the outer circumferential surface and the inner circumferential surface of the felt with the base fabric B. The seam felt can be used as an endless felt in a papermaking machine by once removing the core wire S, by transporting the open-ended felt to the papermaking machine and by inserting the core wire S again into the seam loops in the papermaking machine.

[0010] Methods of forming seam loops according to the prior art include, for example, a method of forming seam loops at a predetermined position of the base fabric B when weaving an endless shape by hollow weaving, and a method of forming seam loops at a predetermined position of a base fabric B after weaving an endless or open-ended woven fabric.

[0011] According to Patent Documents 2 and 3, methods of forming seam loops at a predetermined position of fabric B after weaving are known in which the CD yarns of the portion forming the seam loops of the woven fabric are removed. Moreover, according to Patent Document 4, a method is known in which a skipper or a special filler yarn is used as the CD yarn which is removed from the portion forming the seam loops.

PRIOR ART DOCUMENTS

Patent Documents

[0012]

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Patent Document 1:PCT/JP-A-2004-512441
Patent Document 2:WO-A-89/12717
Patent Document 3:US 8353252
Patent Document 4:PCT/JP-2010-540794

SUMMARY OF THE INVENTION

Problems to be Solved by the Invention

[0013] However, when removing the CD yarns of the portion forming the seam loops (seam loop region) of the woven fabric after weaving as in Patent Documents 2 to 4, there is the problem of damage to the MD yarns of the seam loop region, such as the occurrence of scratches to the MD yarns of the seam loop region due to the means of removal, or the dissolution of the MD yarns due to the friction between the MD yarns of the seam loop region and the CD yarns to be removed. Damage to the MD yarns of the seam loop region is not only a cause for the reduction of base fabric or felt production yield, but there is also the fear that the service life of the felt will be reduced due to the breakage of seam loops when the core wire is inserted or when the felt is used.

[0014] Consequently, the object of the present invention is to provide a base fabric for a papermaking felt wherein there is no damage to the MD yarns of the seam loops or wherein there is no damage that will reduce the seam loop strength and a method of producing the same.

Means for solving the Problems of the Invention

[0015] The present inventors, as a result of intensive studies in order to achieve the above object, found that by removing CD yarns from a part other than the part in which the strength of the seam loops is reduced when MD yarns of the seam loop region formed by the seam loops in a woven fabric are damaged (hereinafter referred to as "CD yarn no-removal part"), and by moving CD yarns of the CD yarn no-removal part and CD yarns from between the CD yarn no-removal part and the part in which the CD yarns have been removed in the direction of the part in which the CD yarns have been removed, it is possible to form seam loops wherein there is no damage to the MD yarns or wherein there is no damage that will reduce the strength of the seam loops.

[0016] In other words, the present invention relates to the following.

(1) A base fabric for a papermaking felt wherein seam loops are formed by MD yarns, which is made from MD yarns of the felt running direction (MD) and CD yarns of the felt cross-direction (CD); wherein the seam loops are obtained by removing CD yarns from a part other than the CD yarn no-removal part of a woven fabric comprising a seam loop region having the CD yarn no-removal part, and by moving CD yarns of the CD yarn no-removal part and CD yarns from between the CD yarn no-removal part and the part in which the CD yarns have been removed in the direction of the part in which the CD yarns have been removed, and wherein the strength of the MD yarns of the part in which the CD yarns have been removed is lower than the strength of the MD yarns of the CD yarn no-removal part.

(2) A base fabric according to (1); wherein the length of the CD yarn no-removal part in the felt running direction (MD) is 10 to 100 % of the seam loop region in the felt running direction (MD).

(3) A base fabric according to (1) or (2); wherein the CD yarn no-removal part comprises a part that is to become the top part of the seam loops, and wherein the CD yarn removal part is provided so that the end part of the side of the part that is to become the seam loop top part is situated 5 % or more of the length of the seam loop region in the felt running direction (MD) from the part that is to become the seam loop top part.

(4) A base fabric for a papermaking felt formed by joining together two or more of the base fabric according to (1) in the cross-felt direction (CD).

(5) A base fabric according to (4); wherein the width dimension in the cross-felt direction (CD) of the base fabric according to (1) is 50 cm to 1000 cm.

(6) A base fabric for a papermaking felt formed by providing an additional base fabric either on the front side or on the rear side of the base fabric according to (4).

(7) A method of producing a base fabric for a papermaking felt wherein seam loops are formed by MD yarns, which is made from MD yarns and CD yarns; wherein are comprised
a step for weaving a woven fabric from MD yarns and CD yarns, wherein is comprised a seam loop region having a CD yarn no-removal part;
a step for removing CD yarns from a part other than the CD yarn no-removal part; and
a step for forming seam loops by moving CD yarns of the CD yarn no-removal part and CD yarns from between the CD yarn no-removal part and the part in which the CD yarns have been removed in the direction of the part in which the CD yarns have been removed.

(8) A method of production according to (7); wherein the length of the CD yarn no-removal part in the felt running direction (MD) is 10 to 100 % of the length of the seam loop region in the felt running direction (MD).

(9) A method of production according to (7) or (8); wherein the CD yarn no-removal part comprises a part that is to become the top part of the seam loops, and wherein the CD yarn removal part is provided so that the end part of the side of the part that is to become the seam loop top part is situated 5 % or more of the length of the seam loop region in the felt running direction (MD) from the part that is to become the seam loop top part.

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(10) A method of production according to any one of (7) to (9); wherein, in the step for weaving a woven fabric, a different type of yarn is used for the CD yarns of the CD yarn removal part than for the CD yarns constituting the base fabric for a papermaking felt.

(11) A method of production according to any one of (7) to (10); wherein the step for removing CD yarns comprises a step for cutting the CD yarns to be removed at predetermined intervals.

Advantages of the Invention

[0017] By the above constitution it is possible to provide a base fabric for a papermaking felt wherein there is no damage to the MD yarns of the seam loop region or wherein there is no damage that will reduce the seam loop strength and a method of producing the same.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018]

Fig. 1 is a schematic view of a prior art seam felt for papermaking.

Fig. 2 shows the engaging operations of a prior art seam felt for papermaking.

Fig. 3 is a schematic view showing the base fabric end of a prior art seam felt for papermaking.

Fig. 4 is a schematic view showing the base fabric end of a prior art seam felt for papermaking.

Fig. 5 is a schematic view of a base fabric for a papermaking felt according to the present invention.

Fig. 6 is a schematic view of a woven fabric constituting a base fabric for a papermaking felt according to the present invention.

Fig. 7 is a schematic view showing the constitution of the seam loop region of a woven fabric constituting a base fabric for a papermaking felt according to the present invention.

Fig. 8 is a view showing embodiments of the positional relationship of the CD yarn no-removal part, the CD yarn removal part and the seam loop region in a woven fabric constituting a base fabric for a papermaking felt according to the present invention.

Fig. 9 is a view showing embodiments of the positional relationship of the CD yarn no-removal part, the CD yarn removal part and the seam loop region in a woven fabric constituting a base fabric for a papermaking felt according to the present invention.

Fig. 10 is a view showing one embodiment of the positional relationship of the CD yarn no-removal part, the CD yarn removal part and the seam loop region in a woven fabric constituting a base fabric for a papermaking felt according to the present invention.

Fig. 11 is a view showing one embodiment of a method of producing a base fabric for a papermaking felt according to the present invention.

Fig. 12 is a view showing one embodiment of a method of producing a base fabric for a papermaking felt according to the present invention.

Fig. 13 is a view showing one embodiment of a method of producing a base fabric for a papermaking felt according to the present invention.

Fig. 14 is a view showing one embodiment of a method of producing a base fabric for a papermaking felt according to the present invention.

Fig. 15 is a view showing the woven fabric of Example 1.

Fig. 16 is a view showing the woven fabric of Comparative Example 1.

Fig. 17 is (1) a photograph of the MD yarns constituting the seam loops formed by moving CD yarns on the extension line in the felt running direction (MD) of the end part vicinity of the side (X side) from which the CD yarns cut in Example 1 were pulled out, (2) a photograph of the MD yarns constituting the seam loops of each end part vicinity of the side (X side) from which the CD yarns cut in Comparative Example 1 were pulled out, and (3) a photograph of MD yarns constituting the seam loops near the ends at the opposite side (Y side) of the side from which the CD yarns cut in Comparative Example 1 were pulled out.

BEST MODES FOR CARRYING OUT THE INVENTION

[0019] Hereinafter, embodiments of a base fabric for a papermaking felt having seam loops according to the present invention and a method of producing the same will be explained while referring to the drawings; however, the present invention is not limited thereto.

[0020] Moreover, unless otherwise defined in the present specification, the technical and scientific terms used in the present specification have the meaning commonly understood by a person skilled in the art. All patents, applications and other publications referred to in the present specification, including information available from the Internet, are hereby incorporated by reference in their entirety into the present specification.

[0021] A base fabric B for a papermaking felt according to the present invention, as shown in Fig. 5, comprises MD yarns of the felt running direction (MD) and CD yarns of the cross-felt direction (CD). Seam loops L are formed by the MD yarns. The seam loops L are obtained by removing CD yarns from a part other than the CD yarn no-removal part 4 of a woven fabric comprising a seam loop region 5 having the CD yarn no-removal part 4 shown in Fig. 6, and by moving CD yarns of the CD yarn no-removal part 4 and CD yarns from between the CD yarn no-removal part 4 and the part in which the CD yarns have been removed in the direction of the part in which the CD yarns have been removed. The strength of the MD yarns of the part in which the CD yarns have been removed is lower than the strength of the MD yarns of

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the CD yarn no-removal part 4.

[0022] The difference between the strength of the MD yarns of the part in which the CD yarns have been removed and the strength of the MD yarns in the CD yarn no-removal part 4 is not particularly limited as long as the former is lower than the latter and the same quality is guaranteed in the parts of the papermaking felt comprising the part in which the CD yarns have been removed as in the parts of the papermaking felt comprising other regions; the difference can for example be 30 to 99 %, or more specifically 30 to 80 %.

[0023] In the present invention, firstly a woven fabric to be used as base fabric for a papermaking felt is produced.

[0024] The woven fabric may be produced by weaving an endless shape by hollow weaving, or it may be produced by joining together both ends of an open-ended shape to form an endless shape.

[0025] Examples of weave patterns of the woven fabric include plain weave, twill weave and satin weave; plain weave is preferred. The spacing between the MD yarns is not particularly limited; however, 30 to 65 yarns/5 cm is preferred and 40 to 55 yarns/5 cm is even more preferred. The spacing between the CD yarns is not particularly limited; however, 30 to 65 yarns/5 cm is preferred and 40 to 55 yarns/5 cm is even more preferred.

[0026] The weave pattern of the seam loop region 5, the CD yarn removal part 6 and other regions may be the same or may be different.

[0027] The seam loop regions 5 are provided at positions corresponding to both ends of the base fabric in the woven fabric when the base fabric for a papermaking felt is formed from a woven fabric. The length of the seam loop region 5 in the MD direction is determined by the diameter of the core wire inserted later. Examples of core wire include, for example, a monofilament of a diameter of 1.28 mm and a bundle of 4 monofilaments of a diameter of 0.35 mm each.

[0028] As shown in Fig. 7, the seam loop region 5 comprises the CD yarn no-removal part 4. Moreover, the CD yarn no-removal part 4 comprises a part 7 that is to become the top part of the seam loops. In the present invention, the part 7 that is to become the seam loop top part comprises the apex of each MD yarn when both ends of the seam loop region 5 are folded together in the felt running direction (MD). This part is a predetermined part positioned at equidistance from both ends of the seam loop region 5 in the felt running direction (MD). In the present invention, the CD yarn no-removal part 4 is the part within the seam loop region 5 in which the seam loop strength is adversely affected (the seam loop strength is reduced) when the MD yarns of the seam loop region 5 forming the seam loops are damaged, for example, in case CD yarns are cut and pulled out from the seam loop region 5, and when damage to the MD yarns occurs due to this removal. The length of the CD yarn no-removal part 4 in the felt running direction (MD) may be equal to or shorter than the length of the seam loop region 5 in the felt running direction (MD); for example, it may be 10 to 100 %, or preferably 50 to 100 %, of the number of CD yarns of the seam loop region.

[0029] The CD yarn removal part 6 may be provided on one side of the CD yarn no-removal part 4 of each seam loop region 5 or it may be provided on both sides in the felt running direction (MD). It is possible to provide one or more CD yarn removal part(s) 6 for each seam loop region 5. Both in case the CD yarn removal part 6 is provided on one side of each of the CD yarn no-removal parts 4 in the felt running direction (MD) and in case it is provided on both sides, one region for each side is preferred. From the point of view that, after removing CD yarns from the CD yarn removal part 6, CD yarns of the CD yarn no-removal part 4 and CD yarns from between the CD yarn no-removal part 4 and the part in which the CD yarns have been removed are moved in the direction of the part in which the CD yarns have been removed, it is preferred to repeatedly remove continuous multiple units of CD yarns for each region at a time. For example, in case the weave pattern of the woven fabric is a plain weave, it is preferred to remove an even number of continuous CD yarns for each region.

[0030] From the point of view of avoiding damage to the MD yarns of the CD yarn no-removal part 4 due to the removal of CD yarns from the CD yarn no-removal part 4, the CD yarn removal part 6 is not particularly limited as long as it does not comprise the CD yarn no-removal part 4. The CD yarn removal part 6 and the CD yarn no-removal part 4 may be adjacent or may be distant from each other.

[0031] Preferably, the CD yarn removal part 6 is provided at a length of 5 % or more in the felt running direction (MD) of the seam loop region 5 from the part 7 that is to become the seam loop top part at the end of the side that is to become the seam loop top part, more preferable it is 5 to 100 %, even more preferable it is 25 to 80 % and most preferable it is 50 to 75%. From the point of view of the efficiency with which CD yarns of the CD yarn no-removal part 4 and CD yarns from between the CD yarn no-removal part 4 and the part in which the CD yarns have been removed are moved in the direction of the part in which the CD yarns have been removed, it is preferred that the CD yarn removal part 6 is 25 to 80 % and even more preferred 50 to 75 %.

[0032] In one embodiment, the length of the CD yarn no-removal part 4 in the felt running direction (MD) is equal to the length of the seam loop region 5 in the felt running direction (MD), and the CD yarn removal part 6 is provided on one side of the seam loop region 5 so as not to adjoin the seam loop region 5 (Fig. 8 (1)).

[0033] In one embodiment, the length of the CD yarn no-removal part 4 in the felt running direction (MD) is shorter than the length of the seam loop region 5 in the felt running direction (MD), and the CD yarn removal part 6 is provided on one side of the seam loop region 5 so as not to adjoin the seam loop region 5 (Fig. 8 (2)).

[0034] In one embodiment, the length of the CD yarn

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no-removal part 4 in the felt running direction (MD) is equal to the length of the seam loop region 5 in the felt running direction (MD), and the CD yarn removal part 6 is provided on both sides of the seam loop region 5 so as not to adjoin the seam loop region 5 (Fig. 8 (3)).

[0035] In one embodiment, the length of the CD yarn no-removal part 4 in the felt running direction (MD) is shorter than the length of the seam loop region 5 in the felt running direction (MD), and the CD yarn removal part 6 is provided on both sides of the seam loop region 5 so as not to adjoin the seam loop region 5 (Fig. 8 (4)).

[0036] In one embodiment, the length of the CD yarn no-removal part 4 in the felt running direction (MD) is equal to the length of the seam loop region 5 in the felt running direction (MD), and the CD yarn removal part 6 is provided on one side of the seam loop region 5 so as to adjoin the seam loop region 5 (Fig. 9 (1)).

[0037] In one embodiment, the length of the CD yarn no-removal part 4 in the felt running direction (MD) is shorter than the length of the seam loop region 5 in the felt running direction (MD), and the CD yarn removal part 6 is provided on one side of the seam loop region 5 so as to adjoin the seam loop region 5 (Fig. 9 (2)).

[0038] In one embodiment, the length of the CD yarn no-removal part 4 in the felt running direction (MD) is equal to the length of the seam loop region 5 in the felt running direction (MD), and the CD yarn removal part 6 is provided on both sides of the seam loop region 5 so as to adjoin the seam loop region 5 (Fig. 9 (3)).

[0039] In one embodiment, the length of the CD yarn no-removal part 4 in the felt running direction (MD) is shorter than the length of the seam loop region 5 in the felt running direction (MD), and the CD yarn removal part 6 is provided on both sides of the seam loop region 5 so as to adjoin the seam loop region 5 (Fig. 9 (4)).

[0040] In one embodiment, the length of the CD yarn no-removal part 4 in the felt running direction (MD) is shorter than the length of the seam loop region 5 in the felt running direction (MD), and the CD yarn removal part 6 is provided on one side of the CD yarn no-removal part 4 so as not to adjoin the CD yarn no-removal part 4 and to partially overlap the seam loop region 5 (Fig. 10 (1)).

[0041] In one embodiment, the length of the CD yarn no-removal part 4 in the felt running direction (MD) is shorter than the length of the seam loop region 5 in the felt running direction (MD), and the CD yarn removal part 6 is provided on one side of the CD yarn no-removal part 4 so as to adjoin the CD yarn no-removal part 4 and to partially overlap the seam loop region 5 (Fig. 10 (2)).

[0042] In one embodiment, the length of the CD yarn no-removal part 4 in the felt running direction (MD) is shorter than the length of the seam loop region 5 in the felt running direction (MD), and the CD yarn removal part 6 is provided on both sides of the CD yarn no-removal part 4 so as not to adjoin the CD yarn no-removal part 4 and to partially overlap the seam loop region 5 (Fig. 10 (3)).

[0043] In one embodiment, the length of the CD yarn no-removal part 4 in the felt running direction (MD) is shorter than the length of the seam loop region 5 in the felt running direction (MD), and the CD yarn removal part 6 is provided on both sides of the CD yarn no-removal part 4 so as to adjoin the CD yarn no-removal part 4 and to partially overlap the seam loop region 5 (Fig. 10 (4)).

[0044] The length of each seam loop region 5 in the felt running direction (MD) is the total length of one or more CD yarn removal part(s) 6 provided on one side or on both sides of the seam loop region 5 in the felt running direction (MD). The length of each CD yarn removal part 6 in the felt running direction (MD) is not particularly limited as long as this condition is fulfilled.

[0045] As material of the MD yarns and CD yarns, general purpose materials employed in base fabrics for papermaking felts may be used. They may be appropriately selected from fiber materials such as nylon, polyester, polypropylene, natural materials, and the like. The material of the MD yarns and CD yarns may be identical or different.

[0046] The material of the CD yarns of the seam loop region 5, the CD yarns to be removed and the CD yarns of other regions may be identical or different. For the purpose of increasing the distinguishability of the CD yarns to be removed, it is also possible to use a different material only for the CD yarns to be removed or to use the same material with a different colour. Moreover, it is possible to use a material that is easy to remove for the CD yarns to be removed. Apart from the CD yarns mentioned above, it is possible to use, for example, a water soluble fiber for the CD yarns to be removed.

[0047] The spacing of the CD yarns of the seam loop region 5, the CD yarns to be removed and the CD yarns in other regions may be identical or different.

[0048] The woven fabric is next subjected to the step for removing CD yarns from the CD yarn removal part 6.

[0049] The means for removing CD yarns from the CD yarn removal part 6 are not particularly limited; however, the CD yarns to be removed may for example be cut at predetermined intervals of, for example, 3 to 30 cm, and the cut CD yarns may be pulled out. The means for pulling the yarns out are not particularly limited; however, the yarns can be removed by a gripping tool having a taper or a tip that is suitable for gripping an object (CD yarns) from a woven fabric such as radio pliers, pliers, and the like. When water soluble fibers are used as CD yarns to be removed, the CD yarns are removed by dissolving them in water.

[0050] Next, a step is provided for forming the seam loops by moving CD yarns of the CD yarn no-removal part 4 and CD yarns from between the CD yarn no-removal part 4 and the part in which the CD yarns have been removed in the direction of the part in which the CD yarns have been removed.

[0051] The means for forming the seam loops by moving CD yarns of the CD yarn no-removal part 4 and CD yarns from between the CD yarn no-removal part 4 and the part in which the CD yarns have been removed in the

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direction of the part in which the CD yarns have been removed are not particularly limited; however, the CD yarns may for example be moved one by one from the CD yarn close to the part in which the CD yarns have been removed by a tool having a taper such as a serration or a tip for entering the gaps of the tissue formed by the MD yarns and CD yarns

[0052] Figs 11 to 14 illustrate the displacement of CD yarns in the step for forming the seam loops by moving CD yarns of the CD yarn no-removal part 4 and CD yarns from between the CD yarn no-removal part 4 and a part in which the CD yarns have been removed 6' in the direction of the part in which the CD yarns have been removed 6'. In Figs. 11 to 14, (A) shows the state before the CD yarns are removed, (B) shows the state in which the CD yarns have been removed, and (C) shows the state in which the CD yarns in the seam loop region 5 have disappeared by being moved.

[0053] Fig. 11 shows an embodiment in which the length of the CD yarn no-removal part 4 in the felt running direction (MD) is equal to the length of the seam loop region 5 in the felt running direction (MD), and the CD yarn removal part 6 is provided so as not to adjoin the seam loop region 5. Seam loops are formed by removing CD yarns i to l from the CD yarn removal part 6, and by moving CD yarns c to f of the CD yarn no-removal part 4 and CD yarns g to h from between the CD yarn no-removal part 4 and the part in which the CD yarns have been removed 6' in the direction of the part in which the CD yarns have been removed 6'.

[0054] Fig. 12 shows an embodiment in which the length of the CD yarn no-removal part 4 in the felt running direction (MD) is equal to the length of the seam loop region 5 in the felt running direction (MD), and the CD yarn removal part 6 is provided so as to adjoin the seam loop region 5. Seam loops are formed by removing CD yarns g to j from the CD yarn removal part, and by moving CD yarns c to f of the seam loop region 5 in the direction of the part in which the CD yarns have been removed 6'.

[0055] Fig. 13 shows an embodiment in which the length of the CD yarn no-removal part 4 in the felt running direction (MD) is shorter than the length of the seam loop region 5 in the felt running direction (MD), and the CD yarn removal part 6 is provided so as not to adjoin the CD yarn no-removal part 4, while adjoining the seam loop region 5. Seam loops are formed by removing CD yarns h to m from the CD yarn removal part, and by moving CD yarns b to g of the seam loop region 5 in the direction of the part in which the CD yarns have been removed 6'.

[0056] Fig. 14 shows an embodiment in which the length of the CD yarn no-removal part 4 in the felt running direction (MD) is shorter than the length of the seam loop region 5 in the felt running direction (MD), and the CD yarn removal part 6 is provided so as to adjoin the CD yarn no-removal part 4 and to partially overlap the seam loop region 5. Seam loops are formed by removing CD yarns g to l from the CD yarn removal part, and by moving CD yarns c to f of the seam loop region 5 which were not removed in the direction of the part in which the CD yarns have been removed 6'.

[0057] The base fabric for a papermaking felt according to the present invention may be used as a single base fabric or it may be used by joining together 2 or more base fabrics in the cross-felt direction (CD).

[0058] In case 2 or more base fabrics produced by using an open-ended woven fabric are joined together in the cross-felt direction (CD), it is preferred that the parts joining together both ends of the open-ended woven fabric are not aligned in a line. For this purpose, the seam loop region 5 in each of the open-ended woven fabrics is provided so as not to have the same arrangement.

[0059] The means for the joining together in the cross-felt direction (CD) are not particularly limited; however, such means as sewing by sewing machine, bonding, welding, and the like, can for example be mentioned.

[0060] The width dimension in the cross-felt direction (CD) of each of the base fabrics to be joined together is not particularly limited; however, it is determined according to the specification, the weaving efficiency, and the like, of the weaving machine producing the woven fabric, for example, in the range from 50 to 1,000 cm.

[0061] The number of based fabrics to be joined together and the width dimension in the cross-felt direction (CD) of each base fabric are determined according to the width dimension in the cross-felt direction (CD) of the papermaking felt to be produced in the end.

[0062] Moreover, in case the base fabric for a papermaking felt according to the present invention is a base fabric in which 2 or more base fabrics have been joined together in the cross-felt direction (CD), it is preferred to further provide an additional base fabric at least on one side of either the front side or the rear side of this base fabric for the purpose of securing strength and for preventing the occurrence of marks of the joining part on the web paper web.

[0063] The additional base fabric is not particularly limited; however, as long the strength can be secured and the occurrence of marks of the joining part on the web paper web can be prevented, it can, for example, be freely selected from woven fabrics, nonwoven fabrics, strands of yarn, grid-shaped materials, and the like.

EXAMPLES

[0064] Hereinafter, a base fabric for a papermaking felt according to the present invention will by explained in even greater detail by the example; however, the present invention is not limited by this example.

[0065] The woven fabrics of Example 1 and Comparative Example 1 of 1 m width in the cross-felt direction (CD), 20 m length in the felt running direction (MD), MD yarn spacing of 50 yarns/5 cm and CD yarn spacing of 50 yarns/5 cm were produced by using the MD yarns and the CD yarns shown below. In Example 1, the CD yarns to be removed are used in the CD yarn removal part 6 shown below. In Comparative Example 1, the CD yarns

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to be removed are used in the seam loop region 5.

- MD yarn: polyamide 6 with 0.40 mm fiber diameter
- CD yarn to be removed: polyamide 6 with 0.40 mm fiber diameter
- CD yarn of parts other than the CD yarn removal part 6: polyamide 6 with 0.40 mm fiber diameter

Example 1

[0066] In order to form seam loops of 6 mm length, as shown in Fig. 15, a base fabric was provided with a total of 6 CD yarns to be removed (a to f) in the CD yarn removal part 6, a total of 6 CD yarns (j to o) in the seam loop region 5 which is the CD yarn no-removal part 4, and a total of 3 CD yarns (g to i) between the CD yarn removal part 6 and the seam loop region 5; wherein the CD yarns to be removed were cut at 20 cm intervals, and the cut CD yarns were removed by pulling the ends of each of the cut CD yarns with radio pliers from the same side (X side). The seam loops were formed by moving the CD yarns g to o in the direction of the part in which the CD yarns have been removed.

Comparative Example 1

[0067] In order to form seam loops of 6 mm length, as shown in Fig. 16, a total of 6 CD yarns (a to f) constituting the seam loop region 5 were cut at 20 cm intervals, and the cut CD yarns were removed by pulling the ends of each of the cut CD yarns with radio pliers from the same side (X side).

Rupture Strength Test

[0068] The cutting strength of the samples produced for Example 1 and Comparative Example 1 were measured. One of the MD yarns constituting the seam loops formed by moving CD yarns on the extension line of each end part vicinity of the side (X side) from which the CD yarns cut in Example 1 were pulled out, one of the MD yarns constituting the seam loops of each end part vicinity of the side (X side) from which the CD yarns cut in Comparative Example 1 were pulled out, and one of MD yarns constituting the seam loops of each end part vicinity of the opposite side (Y side) of the side from which the cut CD yarns were pulled out, were respectively selected. A load was applied to the selected MD yarns and the load at the point at which rupture occurred was recorded. The results are shown in Table 1.

Table 1

Unit: kgf/1 yarn			
	Example	Comparative Example	
	X side	X side	Y side
1	4.340	3.480	5.816
2	7.941	2.588	6.727
3	8.731	2.224	6.889
4	6.686	2.208	6.596
5	6.883	3.266	7.431
average	6.916	2.753	6.692

[0069] While the average load recorded for the MD yarns constituting the seam loops formed by moving CD yarns on the extension line in the felt running direction (MD) of each end part vicinity of the side (X side) from which the CD yarns cut in Example 1 were pulled out was 6.916 kgf, the average load recorded for the MD yarns constituting the seam loops of each end part vicinity of the side (X side) from which the CD yarns cut in Comparative Example 1 were pulled out was 2.753 kgf. When comparing Example 1 to Comparative Example 1, the strength declined to about 40 %. It is thought that the reason for this is that the MD yarns constituting the seam loops of each end part vicinity of the side (X side) from which the CD yarns cut in Comparative Example 1 were pulled out were damaged when the CD yarns were cut, and that the MD yarns dissolved at the side at which the CD yarns were pulled out as a result of the frictional heat that occurred when the CD yarns were pulled out at the side (X side) from which the cut CD yarns were pulled out. Compared to this, in Example 1, the MD yarns constituting the seam loops maintained the original strength of the MD yarns used for weaving because there is no risk that the MD yarns constituting the seam loops are damaged when the CD yarns are cut or that they dissolve when the CD yarns are pulled out.

[0070] A photograph of the MD yarns constituting the seam loops formed by moving CD yarns on the extension line in the felt running direction (MD) of the end part vicinity of the side (X side) from which the CD yarns cut in Example 1 were pulled out is shown in Fig. 17 (1). A photograph of the MD yarns constituting the seam loops of each end part vicinity of the side (X side) from which the CD yarns cut in Comparative Example 1 were pulled out is shown in Fig. 17 (2), and a photograph of MD yarns constituting the seam loops near the ends at the opposite side (Y side) of the side from which the cut CD yarns were pulled out is shown in Fig. 17 (3).

[0071] As shown in Fig. 17 (1), damage to the MD yarns of the CD yarn no-removal part 4 was not detected in the base fabric for a papermaking felt of Example 1. On the other hand, while there was minor damage to the MD

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yarns constituting the seam loops in the end part vicinity of the opposite side (Y side) of the side from which the cut CD yarns were pulled out in the base fabric for a papermaking felt of Comparative Example 1, as shown in Fig. 17 (3), damage to the MD yarns of the seam loop region 5 was detected in the end part vicinity of the side (X side) from which the cut CD yarns were pulled out, as shown in Fig. 17 (2). In the end part vicinity of the opposite side (Y side) of the side from which the cut CD yarns were pulled out of end parts other than those shown in Fig. 17 (3), the same degree of damage was observed as in the MD yarns constituting the seam loops in Fig. 17 (3); and in the end part vicinity of the side (X side) from which the cut CD yarns were pulled out of end parts other than those shown in Fig. 17 (2), the same degree of damage was observed as in the MD yarns of the seam loop region 5 shown in Fig. 17 (2).

[0072] The various features of the invention according to the present specification can be combined in different ways. The embodiments obtained by these combinations, including the combinations which are not specifically described in the present specification, are all within the scope of the present invention. Moreover, a person skilled in the art understands that a plurality of variations is possible without departing from the spirit of the present invention, and the equivalents including these variations are also included in the scope of the present invention. It is therefore to be understood that the embodiments described herein are only illustrative and are not intended to limit the scope of the present invention.

Explanation of the Reference Characters

[0073]

F	Felt
L	Seam loops
B	Base fabric
W	Batt layer
S	Core wire
1	CD yarn
2	MD yarn
3	Woven fabric
4	CD yarn no-removal part
5	Seam loop region
6	CD yarn removal part
6'	Part in which the CD yarns have been removed
7	Part that is to become the seam loop top part

Claims

1. A base fabric for a papermaking felt wherein seam loops are formed by MD yarns, which is made from MD yarns of the felt running direction (MD) and CD yarns of the felt cross-direction (CD); wherein the seam loops are obtained by removing CD yarns from a part other than the CD yarn no-removal part of a woven fabric comprising a seam loop region having the CD yarn no-removal part, and by moving CD yarns of the CD yarn no-removal part and CD yarns from between the CD yarn no-removal part and the part in which the CD yarns have been removed in the direction of the part in which the CD yarns have been removed, and wherein the strength of the MD yarns of the part in which the CD yarns have been removed is lower than the strength of the MD yarns of the CD yarn no-removal part.

2. A base fabric according to claim 1; wherein the length of the CD yarn no-removal part in the felt running direction (MD) is 10 to 100 % of the seam loop region in the felt running direction (MD).

3. A base fabric according to claim 1 or 2; wherein the CD yarn no-removal part comprises a part that is to become the top part of the seam loops, and wherein the CD yarn removal part is provided so that the end part of the side of the part that is to become the seam loop top part is situated 5 % or more of the length of the seam loop region in the felt running direction (MD) from the part that is to become the seam loop top part.

4. A base fabric for a papermaking felt formed by joining together two or more of the base fabric according to claim 1 in the cross-felt direction (CD).

5. A base fabric according to claim 4; wherein the width dimension in the cross-felt direction (CD) of the base fabric according to (1) is 50 cm to 1000 cm.

6. A base fabric for a papermaking felt formed by providing an additional base fabric either on the front side or on the rear side of the base fabric according to claim 4.

7. A method of producing a base fabric for a papermaking felt wherein seam loops are formed by MD yarns, which is made from MD yarns and CD yarns; wherein are comprised
a step for weaving a woven fabric from MD yarns and CD yarns, wherein is comprised a seam loop region having a CD yarn no-removal part;
a step for removing CD yarns from a part other than the CD yarn no-removal part; and
a step for forming seam loops by moving CD yarns of the CD yarn no-removal part and CD yarns from between the CD yarn no-removal part and the part in which the CD yarns have been removed in the direction of the part in which the CD yarns have been removed.

8. A method of production according to claim 7; wherein the length of the CD yarn no-removal part in the felt running direction (MD) is 10 to 100 % of the length

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of the seam loop region in the felt running direction (MD).

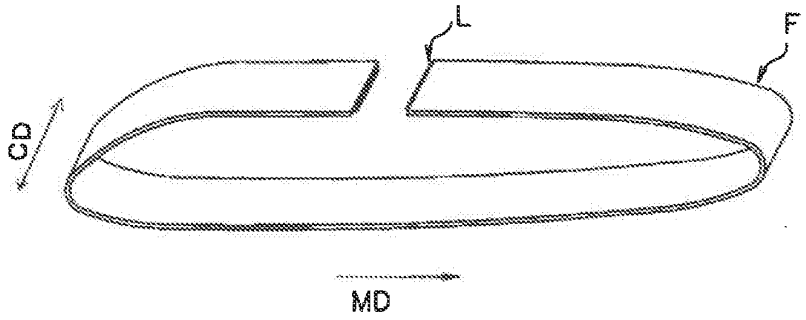
9. A method of production according to claim 7 or 8; wherein the CD yarn no-removal part comprises a part that is to become the top part of the seam loops, and wherein the CD yarn removal part is provided so that the end part of the side of the part that is to become the seam loop top part is situated 5 % or more of the length of the seam loop region in the felt running direction (MD) from the part that is to become the seam loop top part.

10. A method of production according to any one of claims 7 to 9; wherein, in the step for weaving a woven fabric, a different type of yarn is used for the CD yarns of the CD yarn removal part than for the CD yarns constituting the base fabric for a papermaking felt.

11. A method of production according to any one of claims 7 to 10; wherein the step for removing CD yarns comprises a step for cutting the CD yarns to be removed at predetermined intervals.

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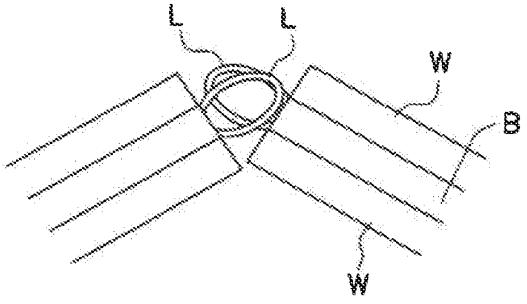
Fig. 1



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Fig. 2

(A)



(B)

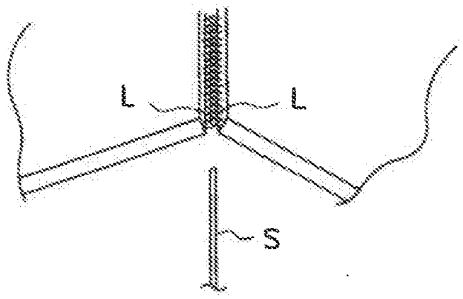
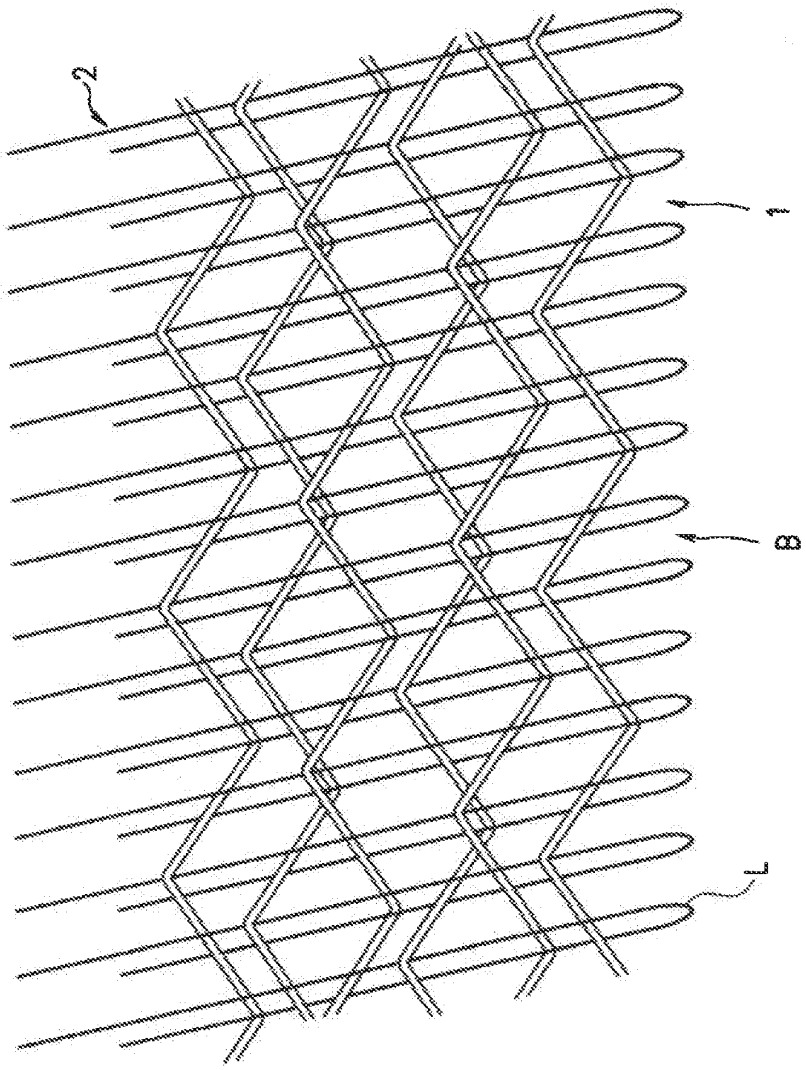
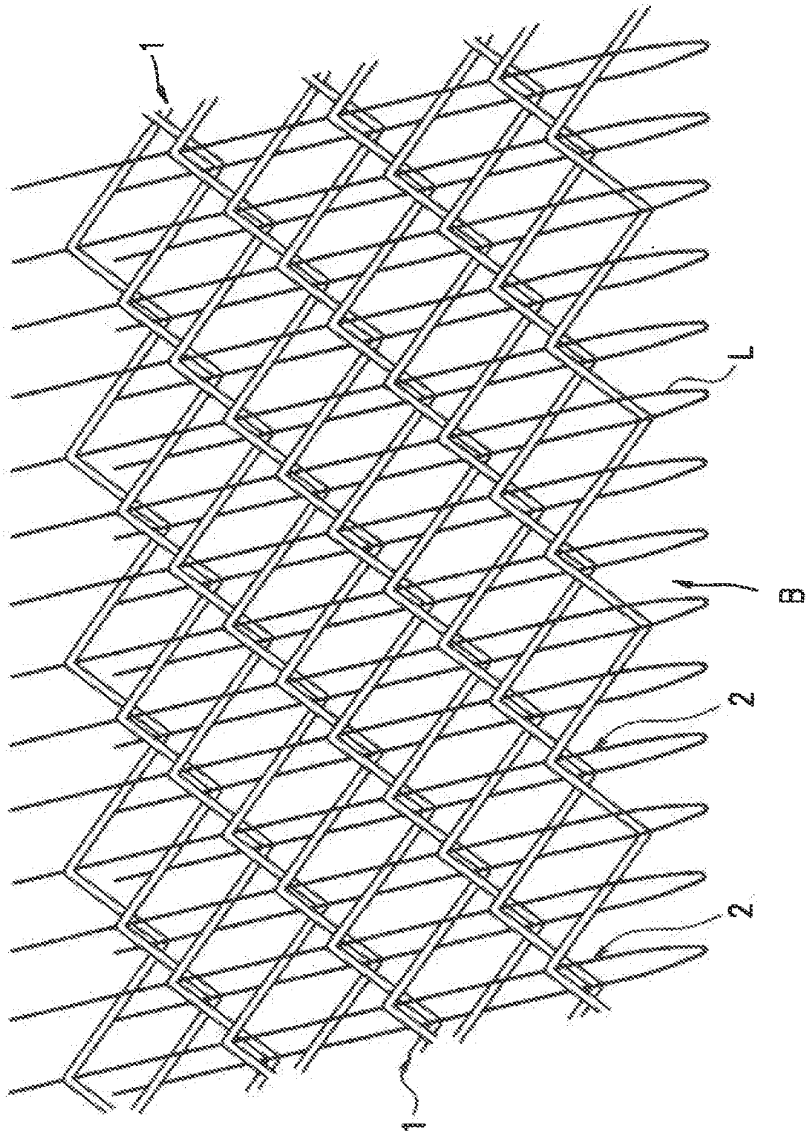


Fig. 3



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Fig. 4



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Fig. 5

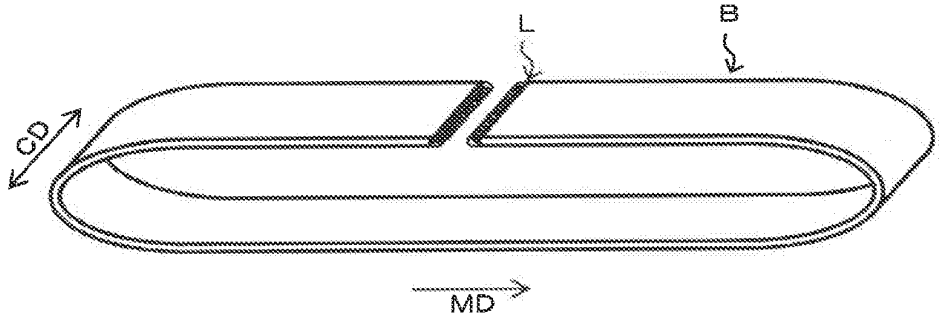
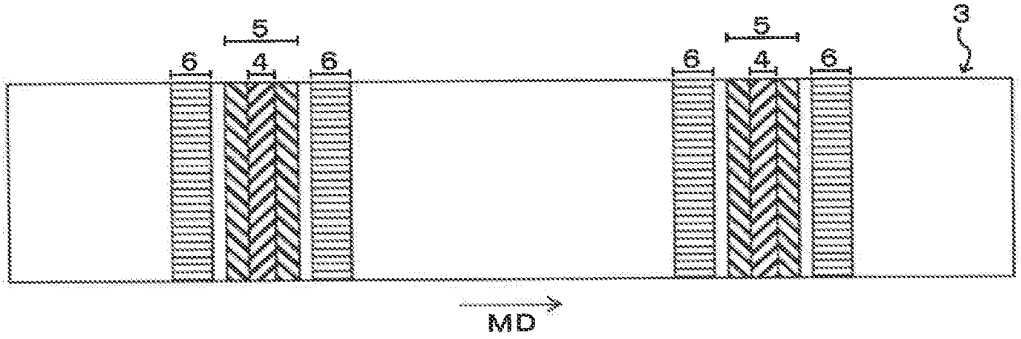


Fig. 6



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Fig. 7

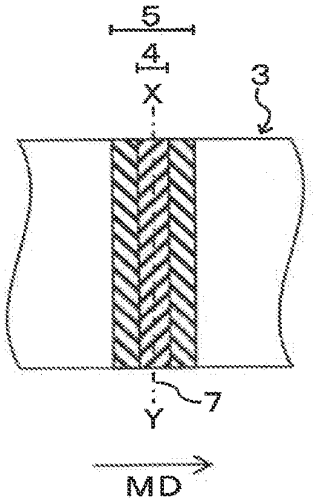
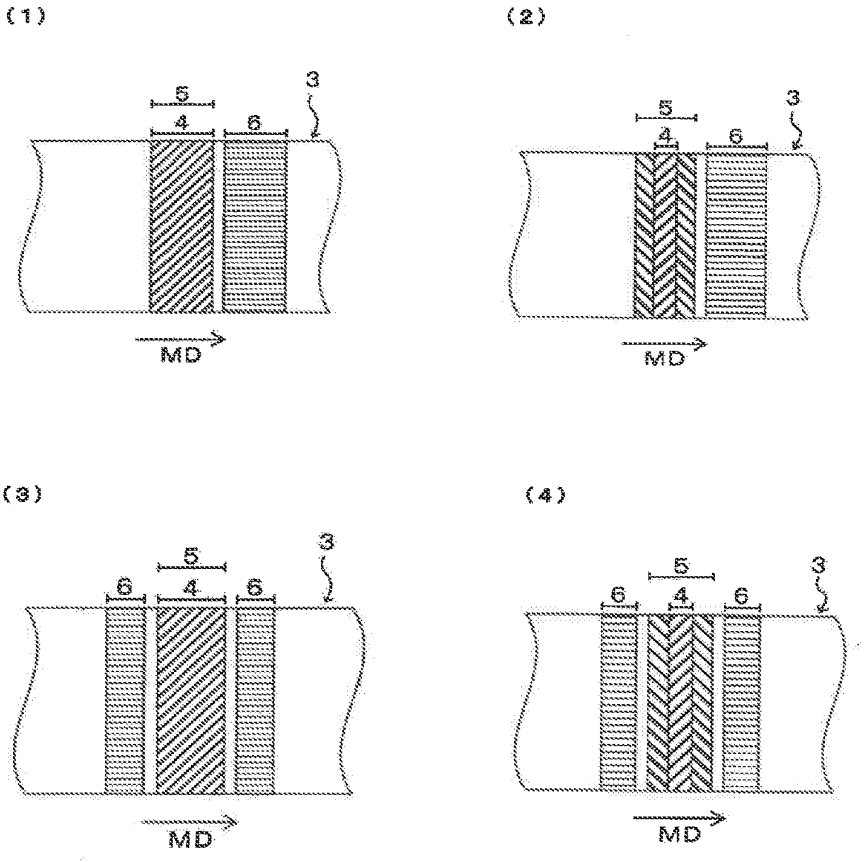
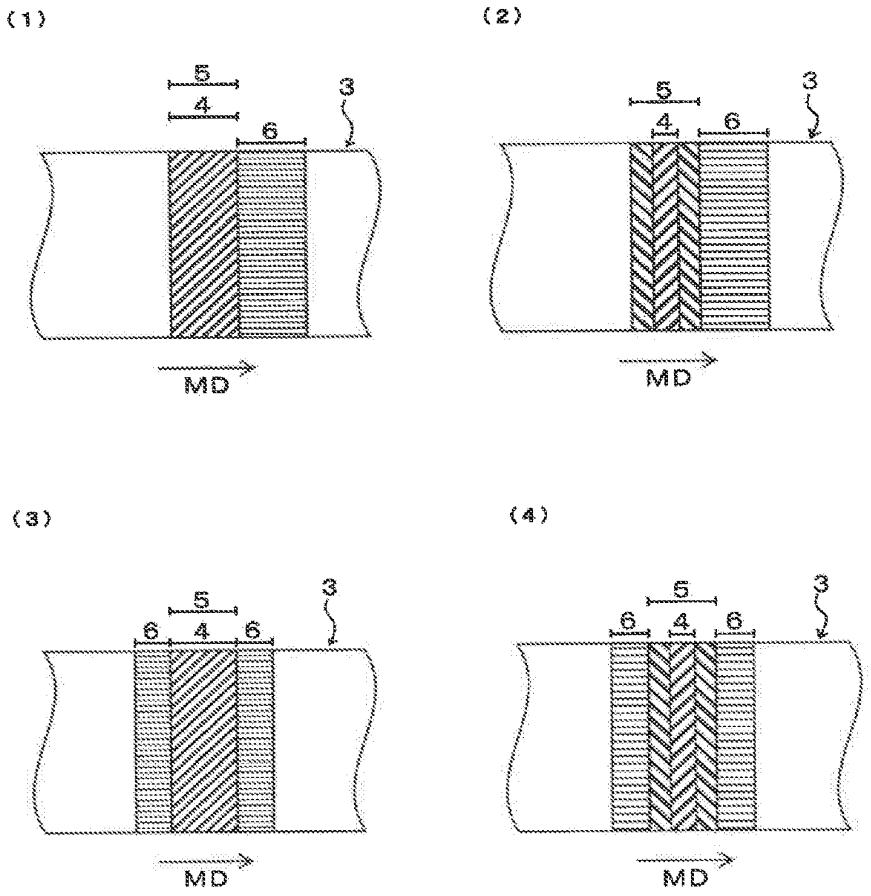


Fig. 8



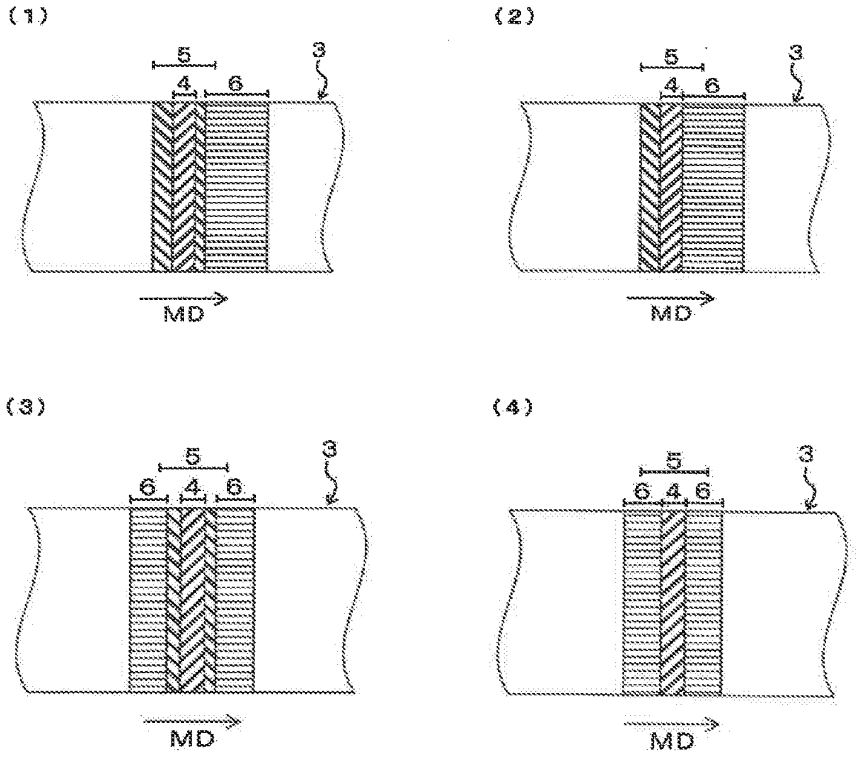
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Fig. 9



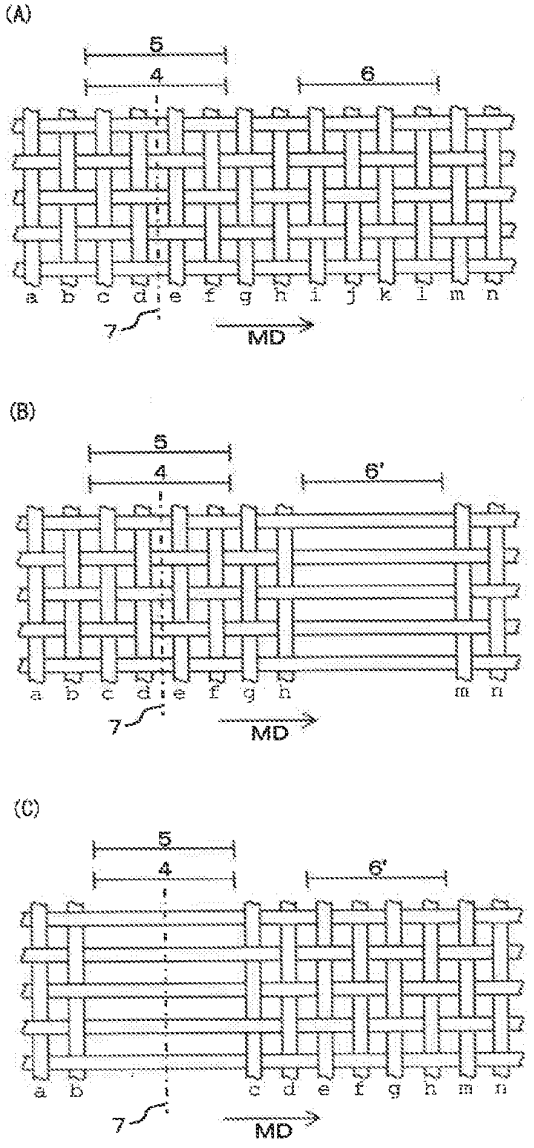
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Fig. 10



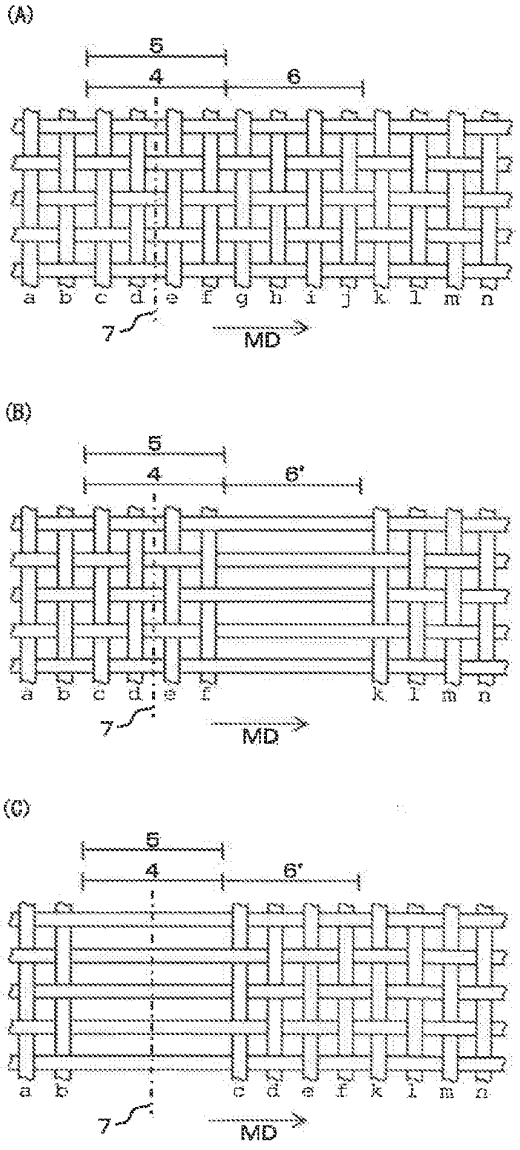
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Fig. 11



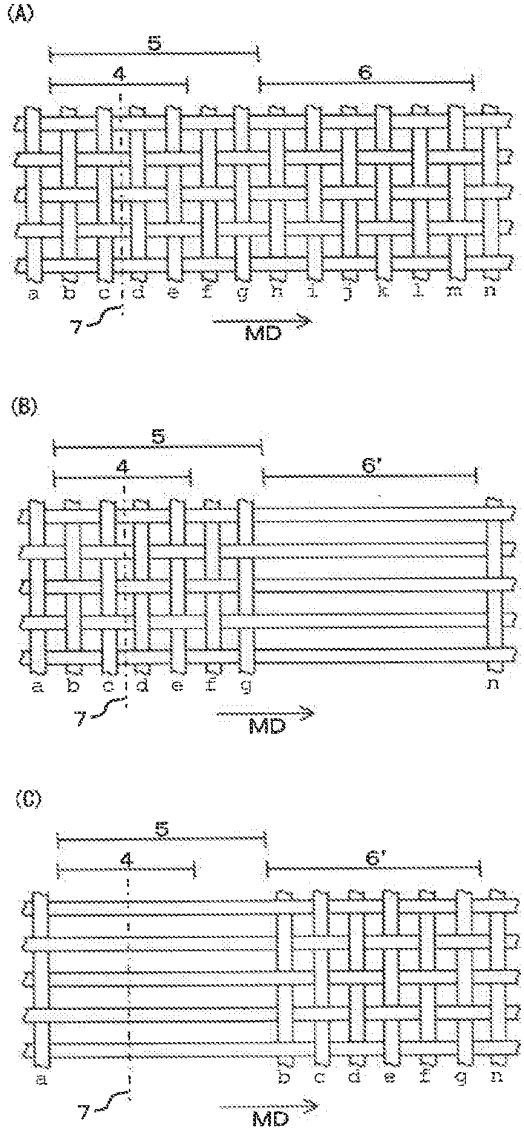
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Fig. 12



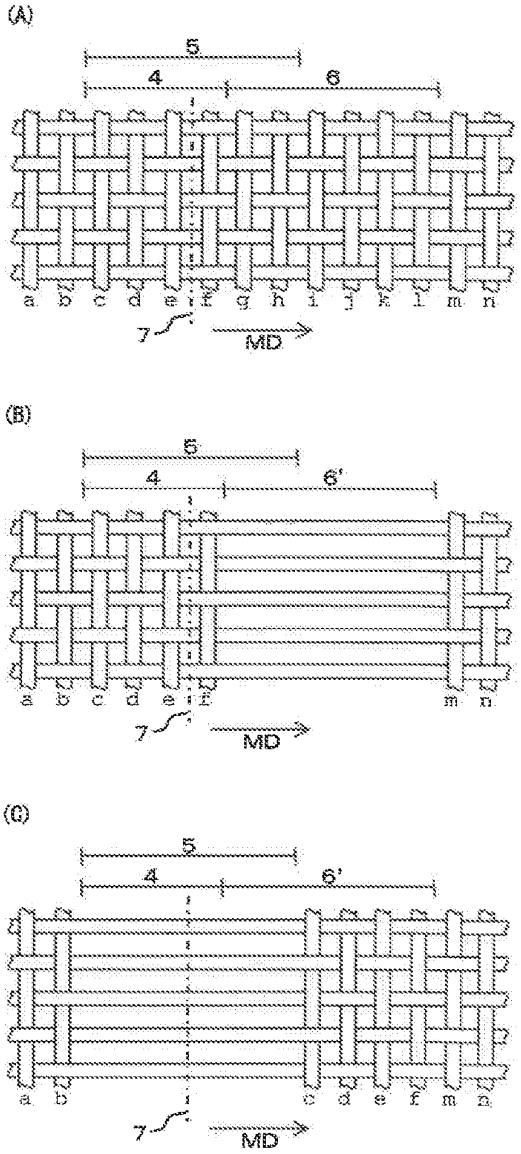
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Fig. 13



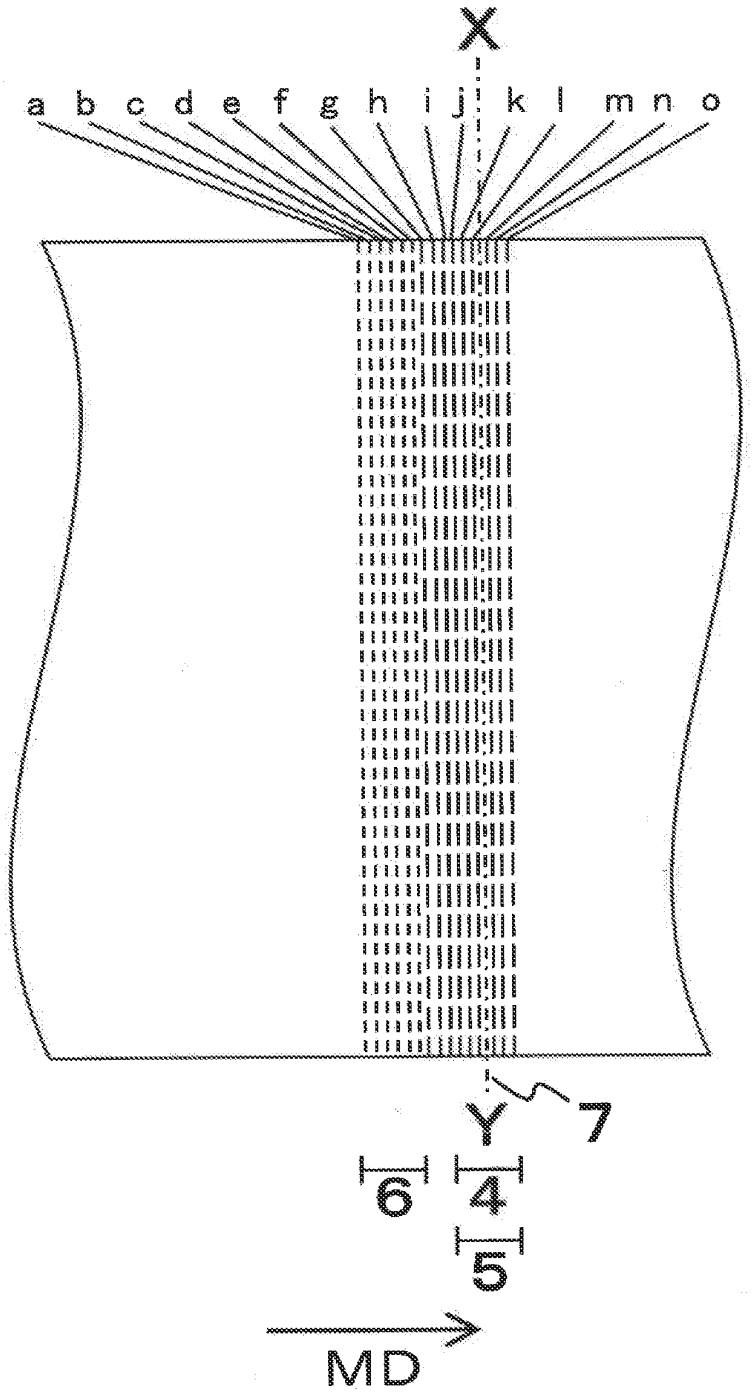
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Fig. 14



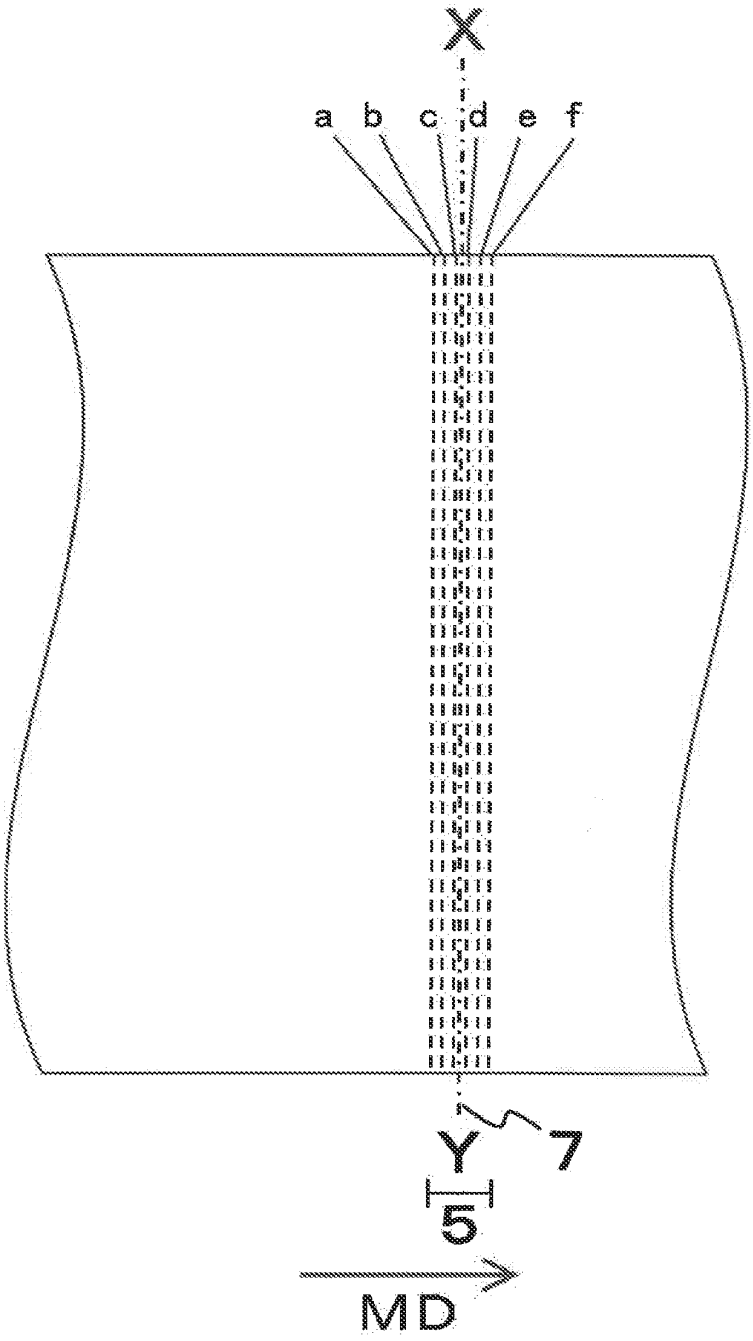
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Fig. 15



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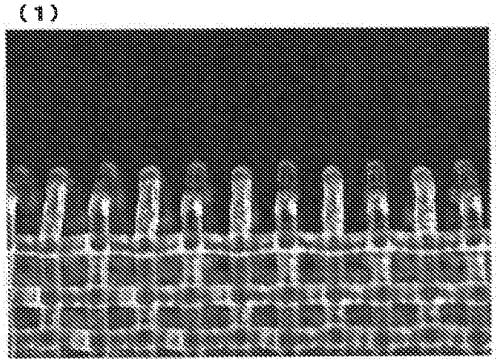
Fig. 16



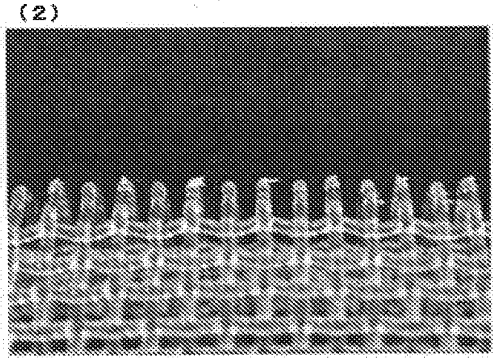
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Fig. 17

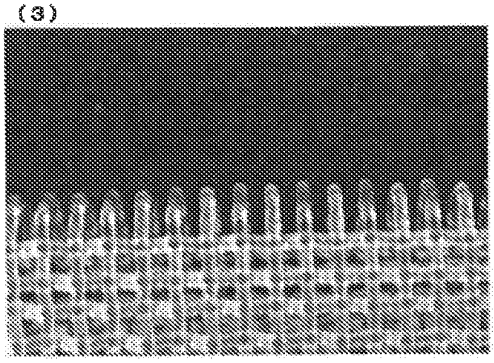
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EUROPEAN SEARCH REPORT

Application Number
EP 17 15 1975

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	US 8 353 252 B1 (KLASCHKA SUSANNE [DE] ET AL) 15 January 2013 (2013-01-15) * abstract; figures *	1,7	INV. D21F7/10

TECHNICAL FIELDS SEARCHED (IPC)

D21F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	17 May 2017	Maisonnier, Claire

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 17 15 1975

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17-05-2017

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		WO 2013083468 A1	13-06-2013

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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(3.10/3.09/3.3.3)

EP 0 425 523 B1

Description

The invention concerns papermaker's fabrics and has more particular reference to a method for the manufacture of a seamed endless structure for use as papermachine clothing or as a base material therein.

There are two basic methods whereby papermakers' fabrics are produced, either the fabric is woven "flat", and the free ends joined, or the fabric is woven "endless".

In the case of the "flat-woven" fabric the warp yarns in the weaving loom extend in the machine direction of the eventual papermaker's fabric, and the fabric is made endless by, for example, weaving weft-free warp yarns at the respective fabric ends back into the fabric direction and by the interdigitated loops of the respective fabric ends thereby to join such ends.

In the "endless-woven" fabric the warp yarns in the loom are the cross-machine direction yarns of the papermaker's fabric.

EP 261488 describes a knitted papermaker's fabric which is folded in such a way that the two end segments rest on the central zone of the fabric. Suitable connecting elements such as spirals are inserted at the fold regions and in combination with a hinge wire join the fabric ends to provide an endless belt.

According to the invention there is proposed a method for the manufacture of a woven papermaker's fabric or of a woven base material for use therein, which includes the steps of bringing each of the intended end regions of the fabric into layer configuration to define fold regions at the respective fabric ends and providing machine direction loops at said ends characterised in that, the fabric is a woven fabric and in bringing the end regions into plural layer configuration, substantially the full longitudinal extent of the fabric is brought into such configuration, and in that, in providing the machine direction loops, cross-machine direction yarns are removed from the said fold regions.

Preferably, the method is characterised in that the superimposed fabric layers are two in number.

The method is preferably further characterised in that the step of bringing the fabric into plural layer configuration includes flattening an endless woven fabric to form fold regions at the respective ends thereof.

Preferably the method is additionally characterised by the further step of needling a textile batt to one face at least of the plural layer structure.

The loops of the respective fold regions may be brought into mutual interdigitated relationship directly to receive a pintle wire in the tunnel formed thereby, thus to form a seam or may be engaged with a spiral coil itself intended to form the seam or a part thereof.

The invention also includes a papermaker's fabric or base fabric therefor made in accordance with the method as aforesaid.

The invention will now be described further, by way of example only, with reference to the accompanying diagrammatic drawings illustrating two embodiments thereof, and in which:-

Figs. 1 to 3 respectively show successive stages in the production of an endless base material for use in a papermaker's fabric and comprising a flat-woven single layer structure;

Fig. 4 is a view corresponding to Fig. 3 and shows an endless-woven base structure having machine direction loops provided therein in accordance with the invention;

Figs. 4A and 4B are enlarged sections taken longitudinally of the structure shown in Fig. 4 at locations A and B, respectively; and

Fig. 5 shows the seam region of base fabrics of the kind shown in Figs. 1 to 3 and Fig. 4, a textile batt having been applied to each face thereof.

Referring now to the drawings, and particularly to Figs. 1 to 3 thereof, a base material for use in the manufacture of a papermaker's wet felt comprises a flat-woven fabric 11 of open weave construction having a length approximately equal to twice the length of the intended end product, that is to say of the papermachine clothing. The free ends 12, 13 are folded over to define a two-ply structure having fold regions 15, 16, the free ends being brought into substantial abutment as shown in Fig. 2.

Weft yarns 14 are removed from the fold regions 15, 16 either before or after folding, to give loops 17, 18 extending outwardly therefrom, the two-ply structure being brought into endless form by the interdigitation of such loops and the introduction of a pintle wire 19 into the tunnel 20 formed thereby as is shown in Fig. 3.

The free ends 12, 13 of the initial flat-woven fabric 11 are sewn to the adjacent fabric ply 21, as at 22 in Fig. 2, whilst the two fabric plies 21, 23 are stitched together in fold regions 15, 16 in closely spaced disposition relative to the loops 17, 18, as is shown at 24.

In a second embodiment, see now Figs. 4, 4A and 4B, in which like reference numerals to those of Figs. 1 to 3 are used for the same or similar parts, an endless-woven fabric is laid flat, and the fold regions 15, 16 between the resultant overlying plies thereof are brought together as shown in Fig. 4. Cross-machine direction yarns, that is to say warp yarns in the loom, are removed from the fold regions to give outwardly extending loops 17, 18 as before, the plies being sewn together in closely spaced disposition relative to the loops, as at 24.

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On interdigitation of loops 17, 18 and the insertion of a pintle wire, the structure is brought back into endless form.

In the event that the machine direction yarns are to form loops at the respective fabric ends for interdigitation and receipt of a pintle wire, such machine direction yarns will ordinarily comprise monofilament yarns. However, if spiral coils are to be applied to the weft free zones and the spirals at the respective fabric ends, rather than machine direction yarn loops, are interdigitated to receive a pintle wire, then such machine direction yarns may, for example, comprise cabled yarns or multifilament yarns.

The cross-machine direction yarns may take the form of, for example, monofilament, cabled monofilament or multifilament yarns.

In producing a wet felt, see now Fig. 5, a textile batt 25 is needled to each face of the endless structure, be it a structure in accordance with the principles of Figs. 1 to 3 or of Figs. 4, 4A and 4B, the needled batt being slit in register with the seam at the paper side, as at 26, and cleared in relation to the seam at the machine side, as at 27, to provide access thereto. The needling operation brings the batt at each face into coherent and homogeneous form through the base structure, and serves also to secure the individual plies of such base structure together.

Whilst the invention is concerned primarily with the production of a base structure for combination with a textile batt in the manufacture of a wet end fabric, it is to be understood that the invention is also of relevance to the production of a two-ply papermaker's fabric comprising a flat-woven or an endless-woven structure brought into endless form in accordance with the method herein disclosed. In the case of a flat-woven structure, the free ends may be secured together, and, if required, to the adjacent ply at the inner face of the eventual papermaker's fabric, by removing cross-machine direction yarns at such ends, interdigitating the fringed-out machine direction yarns and securing those yarns together by means of a thermosensitive adhesive film or tape interposed between the fringed-out ends and the adjacent ply and activated in appropriate manner. Alternatively, the ends may be secured to the fabric ply by employing a powder bonding technique or by sewing.

As will readily be appreciated, in the case of a flat-woven structure requisite lengths of base fabric woven in any desired weave patern may be cut from a stock supply thereof, and a papermaker's fabric meeting the particular requirements of its intended end use as regards performance characteristics can be produced from that base fabric in a simple and ready manner.

In the embodiment herein illustrated the overlying fabric plies are said to be sewn together adjacent the loops and in the region of the abutting fabric ends. It is to be understood that such plies may also be sewn together at any other position or positions intermediate the loops.

The invention is not restricted to the specific structures herein set forth, since alternatives will readily present themselves to one skilled in the art. Thus, not only is the invention of relevance to different weave structures, but in the case of flat woven structures the ends thereof, for example ends 12, 13 in Fig. 2, may be joined together as by a spiral beam or in any other manner.

Claims

1. A method for the manufacture of a woven papermaker's fabric or of a woven base material for use therein which includes the steps of bringing each of the intended end regions (12,13) of the fabric into plural layer configuration to define fold regions (15,16) at the respective fabric ends and providing machine direction loops (17,18) at the respective said ends, characterised in that, the fabric is a woven fabric and in bringing the end regions into plural layer configuration, substantially the full longitudinal extent of the fabric is brought into such configuration, and in that, in providing the machine direction loops (17,18), cross-machine direction yarns (14) are removed from the said fold regions (15,16).

2. The method as claimed in claim 1, characterised by the further step of securing the superimposed layers (21,23) together, at least at positions adjacent the loops.

3. The method as claimed in claim 1 or 2, characterised in that the superimposed layers (21,23) are two in number.

4. The method as claimed in claim 3, characterised in that the step of bringing the fabric into plural layer configuration includes flattening an endless woven fabric, to form fold regions at the respective ends thereof.

5. The method as claimed in claim 3, characterised by the steps of bringing a flat-woven structure into plural layer configuration to define the said fold regions.

6. The method as claimed in any one of the preceding claims, characterised by the further step of securing a respective spiral coil to the loops at each of the fabric ends.

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7. The method as claimed in any one of the preceding claims, characterised by the further step of needling a textile batt (25) to one face at least of the plural layer structure.

8. A papermaker's fabric produced in accordance with the method claimed in any one of the preceding claims.

9. A base material for use in a papermaker's fabric produced in accordance with the method claimed in any one of claims 1 to 6.

Patentansprüche

1. Verfahren zur Herstellung eines Papiermachergewebes oder eines dafür zu verwendenden Grundgewebes mit den Verfahrensschritten: Anordnen jedes der vorgesehenen Endabschnitte (12, 13) des Gewebes in einer Mehrfachlagen-Konfiguration zur Bildung von Faltbereichen (15, 16) an den jeweiligen Gewebeenden und Ausbilden von in Maschinenrichtung liegenden Schlaufen (17, 18) an den jeweiligen Enden,
dadurch gekennzeichnet, daß das Gewebe beim Anordnen der Endbereiche in einer Mehrfachlagen-Konfiguration im wesentlichen über seine gesamte Länge in dieser Konfiguration angeordnet wird, und daß zum Ausbilden der in Maschinenrichtung liegenden Schlaufen (17, 18) in Maschinenquerrichtung liegende Fäden (14) aus den Faltbereichen (15, 16) entfernt werden.

2. Verfahren nach Anspruch 1,
gekennzeichnet durch den weiteren Verfahrensschritt: Verbinden der übereinanderliegenden Lagen (21, 23) miteinander zumindest an Stellen nahe den Schlaufen.

3. Verfahren nach Anspruch 1 oder 2,
dadurch gekennzeichnet, daß die übereinanderliegenden Lagen (21, 23) durch zwei Lagen gebildet sind.

4. Verfahren nach Anspruch 3,
dadurch gekennzeichnet, daß zum Anordnen des Gewebes in einer Mehrfachlagen-Konfiguration ein endlos gewebtes Gewebe zur Bildung von Faltbereichen in dessen jeweiligen Enden flachgedrückt wird.

5. Verfahren nach Anspruch 3,
gekennzeichnet durch den Verfahrensschritt: Anordnen einer flachgewebten Struktur in einer Mehrfachlagen-Konfiguration zur Bildung der Faltbereiche.

6. Verfahren nach einem der vorhergehenden Ansprüche,
gekennzeichnet durch den weiteren Verfahrensschritt: Anbringen je einer Wendel in den Schlaufen der Gewebeenden.

7. Verfahren nach einem der vorhergehenden Ansprüche,
gekennzeichnet durch den weiteren Verfahrensschritt: Vernadeln eines textilen Vlieses (25) mit mindestens einer Seite der Mehrfachlagen-Struktur.

8. Papiermachergewebe, hergestellt gemäß dem Verfahren nach einem der vorhergehenden Ansprüche.

9. Grundstruktur zur Verwendung in einem Papiermachergewebe, das gemäß dem Verfahren nach einem der Ansprüche 1 bis 6 hergestellt wurde.

Revendications

1. Procédé pour la fabrication d'une étoffe de papetier tissée ou d'un matériau de base tissé pour être utilisé dans celle-ci, qui comporte les étapes d'amener chacune des régions d'extrémité (12, 13) d'origine de l'étoffe dans une configuration à plusieurs couches pour définir des régions de pliage (15, 16) aux extrémités respectives de l'étoffe et établir des boucles (17, 18) dans le sens machine aux extrémités respectives, caractérisé en ce que l'étoffe est une étoffe tissée et en amenant les régions d'extrémité dans une configuration à plusieurs couches, à peu près toute l'étendue longitudinale de l'étoffe est amenée dans une telle configuration, et en ce que, en établissant les boucles (17, 18) dans le sens machine, les fils (14) en direction transversale au sens machine sont retirés desdites régions de pliage (15, 16).

2. Procédé selon la revendication 1, caractérisé par l'étape supplémentaire de fixer les couches superposées (21, 23) ensemble, au moins aux positions adjacentes aux boucles.

3. Procédé selon la revendication 1 ou 2, caractérisé en ce que les couches superposées (21, 23) sont au nombre de deux.

4. Procédé selon la revendication 3, caractérisé en ce que l'étape d'amener l'étoffe en une configuration à plusieurs couches comprend l'aplatissement d'une étoffe tissée sans fin pour former des régions de pliage aux extrémi-

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tés respectives de celle-ci.

5. Procédé selon la revendication 3, caractérisé par les étapes d'amener la structure d'étoffe aplatie en une configuration à plusieurs couches pour définir les régions de pliage.

6. Procédé selon l'une quelconque des revendications précédentes, caractérisé par l'étape supplémentaire de fixer une bobine en spirale respective aux boucles à chacune des extrémités de l'étoffe.

7. Procédé selon l'une quelconque des revendications précédentes, caractérisé par l'étape supplémentaire d'aiguilletage d'un fragment textile sur une face au moins de la structure à plusieurs couches.

8. Etoffe de papetier produite selon le procédé revendiqué dans l'une quelconque des revendications précédentes.

9. Matériau de base pour l'utilisation dans une étoffe de papetier produite selon le procédé revendiqué dans l'une quelconque des revendications 1 à 6.

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FIG.1

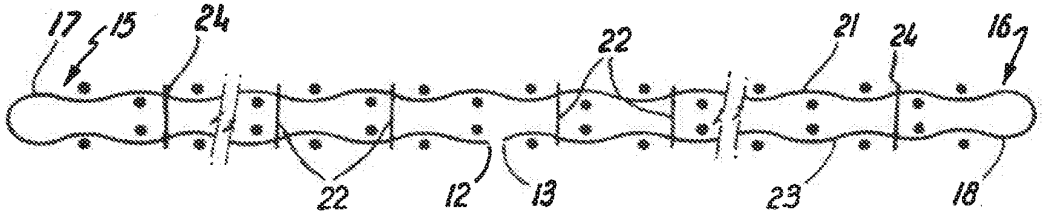


FIG.2

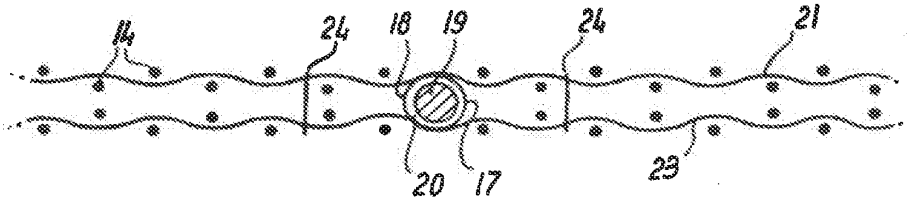


FIG.3

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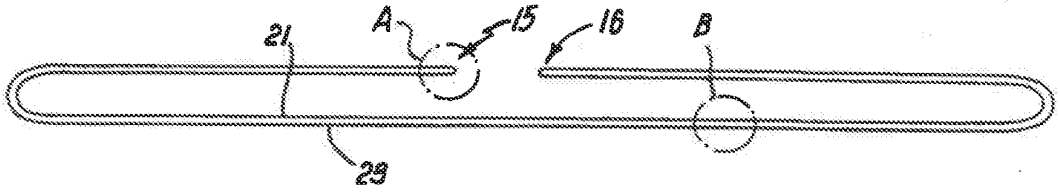


FIG. 4

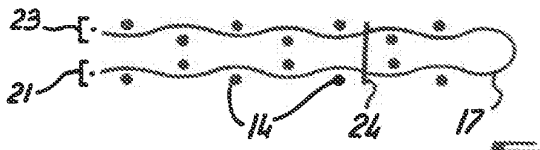


FIG. 4A

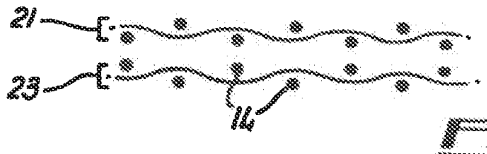


FIG. 4B

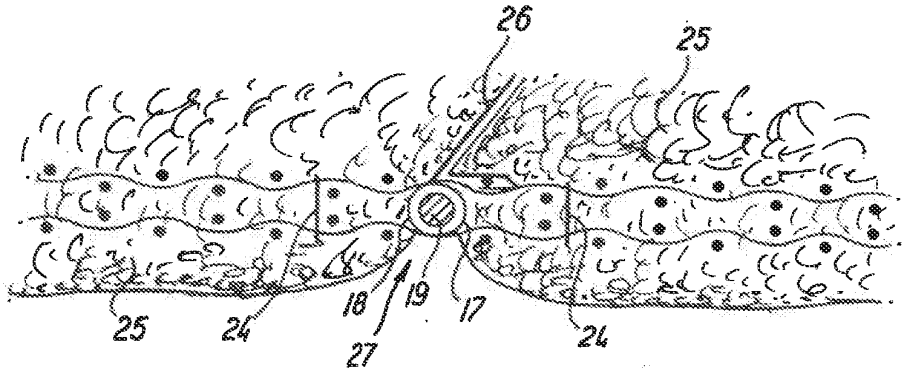


FIG. 5

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TRANSLATION

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2019/055955

A. CLASSIFICATION OF SUBJECT MATTER

D21F 1/00(2006.01)i; ***D21F 7/08***(2006.01)i; ***D21F 7/10***(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)

D21F

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

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

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0425523 A1 (SCAPA GROUP PLC [GB]) 08 May 1991 (1991-05-08) cited in the application column 2, line 24 - column 4, line 6; figures	1
A	US 2017044718 A1 (WICH TORSTEN [US]) 16 February 2017 (2017-02-16) paragraphs [0030] - [0036]; figures	1
A	US 2009090425 A1 (HAWES JOHN M [US] ET AL) 09 April 2009 (2009-04-09) paragraphs [0044] - [0053]; figures	1

☐ 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 another 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	Date of mailing of the international search report
03 April 2019	**15 April 2019**

Name and mailing address of the ISA/EP	Authorized officer
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Form PCT/ISA/210 (second sheet) (January 2015)

TRANSLATION

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/EP2019/055955

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
EP 0425523 A1	08 May 1991	AT 119955 T	15 April 1995
		AU 3839889 A	12 January 1990
		DE 68921754 D1	20 April 1995
		DE 68921754 T2	13 July 1995
		DK 289490 A	05 December 1990
		EP 0425523 A1	08 May 1991
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		WO 8912717 A1	28 December 1989
US 2017044718 A1	16 February 2017	NONE	
US 2009090425 A1	09 April 2009	BR PI0817343 A2	04 October 2016
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		EP 2198083 A1	23 June 2010
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		TW 200936845 A	01 September 2009
		US 2009090425 A1	09 April 2009
		WO 2009046017 A1	09 April 2009

Docket No. VP-22858

C E R T I F I C A T I O N

I, Raffaela Smith, hereby declare that:

- my name and post office address are as stated below;
- I am knowledgeable in the English and German languages;
- I believe that the attached text is a true and complete translation of international patent application No. PCT/EP2019/055955, filed March 11, 2019.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. § 1001 by fine or imprisonment of not more than five (5) years, or both.

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August 6, 2020

CLOTHING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB

The invention relates to a clothing, in particular a seam felt, for a machine for producing a fibrous material web according to the preamble of claim 1.

Clothings which are used in paper machines usually consist of endless belt loops. These belt loops are guided continuously in circulation over a multiplicity of supporting and guiding elements during operation of the machine and, in the process, are always under tension. In addition, they are subjected to loadings by presses, suction elements and the like.

In order to be able to withstand these loadings permanently, such clothings frequently have a woven base structure.

Various possible ways are known for producing a woven base structure in the endless configuration needed for the clothing. Most frequently, such structures are woven in the round. A tubular woven structure is produced directly on the loom. During use in a paper machine, this tube is rotated, so that the weft threads of the loom become the machine direction threads (MD threads) of the clothing.

However, this type of weaving is very time-consuming. In addition, the necessary length of the clothing must already be known exactly during weaving. Weaving "for stock" is not possible.

To enable a more efficient type of production, EP 0 425 523 proposes the use of flat-woven webs. These are provided in twice the length of the necessary clothing. By folding the long-side ends over and placing them on each other, a two-layer laminate structure is produced. By removing the CD threads at the folds, seam loops are produced. By

interengaging the seam loops of both end sides and inserting an insertion element, this base structure can be made endless. As opposed to the structures woven in the round, here the warp threads of the fabric are the MD threads of the clothing. In this way, seam clothings can be produced very efficiently. In particular, a flat fabric can even be produced for stock and stored as a roll if the dimensions of the finished clothing are still not known. To finish the clothing, only the necessary length has to be unwound from the roll and, if appropriate, shortened in width to the clothing width.

However, this type of production also involves disadvantages.

Firstly, these lie in the region of the seam. At the seam point, the properties differ from those of the remaining parts of the clothing. For example, the permeability for water and air is frequently higher here than in the rest of the clothing. As a result, it is possible for quality losses to occur as a result of markings in the paper.

A further critical point is the "join". As result of the folding, the two long-side ends come to lie on one side of the base structure. They can be arranged to butt, overlap or to be at a distance. Also at this point, the properties of the base structure differ from the remaining regions, as a result of which markings in the paper can arise.

It is the object of the present invention, therefore, to specify a clothing which can be produced and used quickly and economically and, at the same time, overcomes the quality deficiencies known from the prior art.

This object is completely achieved by a clothing as claimed in the characterizing part of claim 1.

For a better understanding of the invention, some explanations and definitions which are used within the context of this application should be presented first.

MD threads should be understood as threads which are oriented in the longitudinal direction of the base structure and the clothing or deviate therefrom by at most 10° (MD - machine direction).

CD threads should be understood as threads which are oriented in the transverse direction of the base structure and the clothing or deviate therefrom by at most 10° (CD - cross direction).

Within the context of this application, the term "diameter of a thread" is used. In the case of round threads, this term is well-defined.

For monofilaments which deviate from the round shape, or else for threads twisted from multiple monofilaments, the diameter of the thread should be understood to be the diameter of that circle which has the same area as the cross section of the thread or as the sum of the cross sections of the individual monofilaments.

For a monofilament having a square cross section and

1 mm edge length, the following diameter D would thus result:

$$A = 1[mm^2] = \pi r^2 \Rightarrow r - \sqrt{\frac{1}{\pi}}[mm] \Rightarrow D = 2r \approx 1.12[mm]$$

To determine the diameter of a seam loop, the largest circle which can be inserted completely into the seam loop is ascertained. The diameter of this circle is then viewed as the diameter of the seam loop.

A clothing is proposed, in particular a seam felt for a machine for producing a fibrous material web, in particular paper, board, tissue or pulp web. The clothing comprises a base structure which comprises or consists of a two-layer laminate structure formed from one or more flat-woven elements.

The laminate structure has MD threads which form seam loops at the two end sides of the base structure and the two layers of the laminate structure are connected to each other via the . The clothing is made endless by connecting its end sides by means of a seam. This seam is formed by interengaging the seam loops of the two end sides and the insertion of an insertion element.

According to the invention, provision is made for the diameter of the seam loops (LD-loop diameter) and the diameter of the associated MD threads (MDYD - MD yarn diameter) to have a ratio LD/MDYD between 2.5 and 4, in particular between 2.7 and 3.6.

Trials by the applicant have shown that, given the LD/MDYD ratios according to the invention, the seam produced is optimal from several points of view.

Firstly, it has a very high strength, without which a satisfactory use, for example as a seam felt, is not possible.

In addition, the closure of the seam is very simply possible. The seam of a seam clothing is normally closed in the paper machine itself by drawing in an insertion element, also called a pintle. This drawing-in is done by hand and can be a lengthy process, particularly in wide machines. The fact that the loop diameter does not become too small in relation to the MD thread diameter means that it is made easier to draw in the pintle. In addition to this ergonomic advantage,

the time to draw in a new clothing is shortened, which offers economic advantages for the operator of the installation.

However, the diameter or the LD/MDYD ratio must also not become too large. Excessively large loops can firstly lead to mechanical markings in the paper in that the bends of the loops are impressed into the paper, for example when passing through a press nip. On the other hand, large loops would also mean that the seam area itself becomes comparatively large. Since this seam area differs structurally from the remainder of the clothing and, in particular, also has a changed permeability for water and/or air, there is the danger in the seam area of hydraulic marking of the paper because of different dewatering. For this reason, it is desirable to keep the seam area as small as possible.

The LD/MDYD range according to the invention of between 2.5 and 4, in particular between 2.7 and 3.6, has proven to be the optimum compromise here.

In particular, the applicant has recognized the fact that it is not the absolute loop diameter (in mm) but the relative value LD/MDYD that has to be used as the characteristic variable.

Advantageous embodiments of the invention are described in the independent claims.

Provision can be made for the base structure to comprise still further components besides the two-layer laminate structure. For example, a further woven layer and/or a laid layer and/or a nonwoven layer can also be provided. The additional components can be arranged on the outside of the two-layer laminate structure. Alternatively or additionally, an additional component can also be arranged between the two layers of the two-layer laminate structure.

The two layers of the two-layer laminate structure can also be formed from a single flat-woven element. This flat fabric has – at least approximately – twice the length of the subsequent clothing. By means of folding and laying the two ends of the flat fabric on the central part of the flat cloth, a double-layer structure is produced, the seam loops being formed at the fold points. The long-side ends of the flat-woven element can be arranged to butt, overlap or be at a distance in a "join" area. The overlap or the distance is advantageously less than 5 cm, in particular less than 2 cm.

Alternatively, the two layers can also be formed from multiple flat-woven elements. All these flat-woven elements can have the same length. However, provision can also be made for these flat-woven elements to have different lengths. In these embodiments, too, the seam loops are formed by turning over one or two flat-woven elements. In this way, the two layers of the laminate structure are also connected to each other here by the seam loops.

If the base structure comprises multiple flat-woven elements, then multiple join areas are also produced, of which the same is true as described above for the case of one join area.

When multiple flat-woven elements are used, there is the possibility that all the elements consist of the same cloth. Alternatively, however, provision can also be made for the elements to differ in one or more features. The features can be the weaving pattern, the material, the diameter or the structure of the MD and/or CD threads or other characteristics of the fabric which are known to those skilled in the art.

One or all of the flat-woven elements can, for example, be implemented as a "plain weave", that is to say by means of

a linen weave. This type of fabric is produced very simply and quickly, which is economically advantageous.

However, one known effect in two-layer woven structures is the moiré effect. This occurs more intensely in two-layer linen weaves. To reduce this effect, and thus also to reduce the danger of markings in the paper which are triggered by this effect, it may be advantageous if at least one or all of the flat-woven elements is/are not a linen weave.

In particular, it may be advantageous for this purpose if one or all of the flat-woven elements have floats which extend over two or more threads. Thus, the intensity of the moiré effect can be reduced. Nevertheless, the advantage of simple production of the seam loops is maintained.

All insertion elements known from the prior art can be used as the insertion element. In particular, pintles made of one or more filaments can be used.

The two layers of the two-layer laminate structure can advantageously be connected to each other by sewing or other suitable techniques. Preferably, such connections can be provided in the vicinity of the seam loops and/or in the vicinity of the join areas.

In preferred embodiments, provision can be made for each of the flat-woven elements to have a first and a second long-side end, and for the two-layer laminate structure to have at least one joint, at which two long-side ends are connected to each other. In this embodiment, at least one of the join areas is therefore designed as a joint. As described above, the joined long-side ends can belong to the same flat-woven element or to different flat-woven elements.

The connection at the joint or joints can be made by a multiplicity of known methods. In particular, the connection at the at least one joint can be made by an adhesively bonded

connection and/or a welded connection. For instance, welded joints are possible by means of ultrasound or by means of a laser. Welding by means of an NIR laser in the transmission welding method is particularly advantageous. Laser transmission welding is advantageous in particular since the usual polyamide yarns of the fabric are transparent to laser light in a wide frequency range, and can be welded very simply by using absorbent, for example black, connecting threads. It is also possible to implement the joint in the form of a woven seam. Such woven seams are used, for example, to make woven forming clothings endless. Although woven seams are frequently more complicated to produce than bonded or welded connections, such a joint can have a very high strength.

Connecting the long-side ends by means of a joint offers a series of advantages. Firstly, the tensile strength of the two-layer laminate structure is increased thereby. The joint also serves to fix the loose ends of the MD threads at the long-side ends better. Without any such fixing, in some applications it is possible for these ends to loosen during the operation of the clothing and to be transported through nonwoven layers, etc., which may be present to the surface of the clothing. There, these loose ends can lead to damage and markings in the fibrous material web produced. As a result of fixing the loose ends by means of the joint, it is wholly or largely possible to avoid these ends working their way out.

Provision can preferably be made for the extent of the at least one joint in the machine direction (MD) to be less than 15 mm, less than 10 mm, in particular less than 5 mm. Since, at the joins or joints, there is once more the danger of different dewatering ratios as compared with the remainder of the clothing, a low extent of these areas is advantageous to reduce the tendency to marking.

While, until now, attempts were made in the prior art to make the join or joint area as similar as possible to the remainder of the clothing in important properties such as thickness and permeability, this embodiment of the invention follows a different path. Here, it is accepted that the properties of the base structure and of the clothing can differ from the remainder of the clothing in the joint area. Instead, the aim is to keep this different area as small as possible in the MD direction. In particular, in the case of felts, in which the applied nonwoven layers act as a type of diffuser, the different dewatering in this very small area can no longer be perceived in the paper as a marking.

It may be advantageous to assist this effect if the at least one joint, in particular all the joints, are made by connecting elements, in particular connecting threads, which are welded to at least one, preferably both, long-side end/s.

In particular, connecting threads which are arranged in the CD direction of the clothing can be used as connecting elements, at most three connecting threads, in particular at most two connecting threads, being provided for a joint.

If, for example, a connecting thread is placed transversely over the MD threads of the two long-side ends to be joined and is welded thereto, the result is a very firm joint connection, even with one or two such threads. Thus, the extent of the joint in the MD direction is extremely small, and the effect, for example a different permeability in this area, can no longer be seen in the paper.

Alternatively or additionally, provision can also be made for one or more of the connecting threads to be woven with MD threads of at least one long-side end.

Very suitable for this purpose is, for example, laser transmission welding, since the usual polyamide yarns of the

fabric are transparent to laser light in a wide frequency range – specifically between 800 nm and 1000 nm – and can be welded very simply by using absorbent, for example black, connecting threads. The transparent joint partners in this joining method are heated substantially only at the surface. The structure of this transparent joint partner is largely maintained. This is advantageous, for example, if the transparent joint partner is an MD thread, which is subject to the tensile loading in the finished clothing. This is not substantially weakened by the laser transmission welding. Such a joint also has an adequate strength to withstand processing steps in the further course of production, in particular needling. As opposed to this, joints welded by means of ultrasound are frequently very brittle and fragile and are at least partly destroyed by the needling. As a result of the destruction of the joint, individual thread ends or thread components can also become detached again and project out of the clothing, which means that markings can be produced or the fibrous material web can be damaged.

Instead of threads, other types of connecting elements can also be used, such as woven or nonwoven tapes, strips of polymer material or the like. According to that stated above, it is generally advantageous if connecting elements only a low extent in the MD direction, in particular less than 5 mm, less than 2 mm or still better less than 1 mm.

In advantageous embodiments, provision can be made for the MD threads which are used in particular to form the seam loops to be embodied as monofilaments, in particular as monofilaments with a round cross section.

It may also be advantageous if the diameter of the MD threads is between 0.15 mm and 0.7 mm, in particular between 0.3 mm and 0.5 mm.

Besides the LD/MDYD ratio, it may also be advantageous for the properties of the seam area to match the "loop density" in the seam.

When determining the seam loop density, firstly the number of seam loops per unit length is ascertained. In a fabric having an MD thread density of 64 yarns/100mm, the seam area has twice the number, i.e. 128 yarns/100mm, as a result of the MD threads of the two ends interengaging. If the number of threads is multiplied by the diameter, then the seam loop density (statement in percent) is obtained as a measure of the coverage of the seam area by MD threads. If, in the above example, monofilaments having a diameter of 0.5 mm are used, then the result is a seam loop density of

$$\frac{128/0.5[mm]}{100[mm]} = 64\%$$

It should be noted at this point that the seam loop density of a clothing can change during the production process. For example, thermal method steps can lead to shrinkage of the clothing in the transverse direction. Therefore, the seam loop density before the first thermal method step is normally lower, usually between 55% and 80%, while in the finished clothing it is then higher. The values of the seam loop density indicated in this application relate to the finished clothing, if not otherwise specified.

In a preferred embodiment, provision can be made for the loop density of the seam to be between 64% and 90%, in particular between 72% and 86%, specifically between 78% and 82%. Values of 80%, 81%, 82%, 83%, 84% and 85% have also proven to be particularly advantageous.

Since the permeability of the seam tends to be higher than in the remainder of the clothing, the permeability of the seam can be reduced by a comparatively high seam loop density. Increasing the loop density above 90% can, however,

lead to the ability to seam the clothing simply, mentioned at the beginning, being to some extent lost, since it becomes more difficult to arrange for the seam loops to interengage. In a way similar to that in the LD/MDYD ratio, the range of the seam loop density listed here is, in a certain sense, an optimum range with two opposing requirements.

In this connection, reference should be made once more to the advantages if the base structure is constructed from flat-woven clothing. In classic base structures woven in the round, the fabric is rotated by 90° for use in the clothing. The warp threads of the loom become the CD threads of the clothing, and the weft threads become the MD threads. When flat-woven clothings are used, this is not so in most cases. Here, the fabric is not rotated, so that the MD threads of the base structure correspond to the warp threads of the loom. This has consequences for the respective thread density. During weaving, the weft threads are introduced substantially straight, while the warp threads each alternate from above the weft thread to below the weft thread. This leads, for example in the linen weave, to the crossing warp threads each running between two adjacent weft threads. For this reason, adjacent weft threads cannot be located as close to one another as desired. In the warp threads, there is no such restriction, since no crossing warp threads run between them. Therefore, adjacent warp threads can in principle be arranged as close to one another as desired.

Since, as described above, in flat-woven clothings the weft threads correspond to the MD threads of the clothing, when flat-woven clothings are used a higher MD thread density, and therefore also a higher loop density, can be achieved.

The loop densities of more than 64%, in particular more than 72% or 78%, described in this application can either not be achieved at all in clothings woven in the round or can be achieved by means of extreme weaving conditions such as a

highly increased warp tension, which leads to highly accelerated wear of the loom.

By means of this embodiment of the invention, it is therefore possible to implement a clothing with a seam which – as a result of the high loop density – has a low permeability and nevertheless – as a result of the optimal LD/MDYD ratio, can be closed easily. On the other hand, other known methods for reducing the seam permeability, such as the insertion of a flow-impeding element ("scrim") into the seam area, lead to more difficult closure of the seam.

In advantageous embodiments, the seam area of the clothing – following the closure of the seam by means of the insertion element – can have a permeability which corresponds to between 80% and 130%, in particular between 90% and 120%, of the permeability of the clothing in an area remote from the seam.

In a preferred embodiment, the clothing has one or more layers of nonwoven fibers, at least on its upper side contacting the paper. In particular, the clothing can be a press felt. In addition, the clothing can be provided with one or more layers of nonwoven fibers on the underside contacting the rolls.

Advantageously, provision is made for some of the nonwoven fibers to have a fiber fineness of 67 dtex or more. In particular, these comparatively coarse fibers can be arranged in the direct vicinity of the base structure. Frequently, they are applied as a coarse nonwoven layer and needled with the base structure.

It is also possible for nonwoven fibers having a fineness of 44 dtex and less to be used. In particular, these comparatively fine fibers can be arranged on the paper-contacting upper side of the clothing. These fine fibers can

be arranged on a nonwoven layer having the aforementioned coarse fibers with 67 dtex or more and needled therewith.

In this way, a good connection of the nonwoven layer to the base structure and of the individual nonwoven layers to one another can be achieved.

In particularly advantageous embodiments of the invention, at least some of the nonwoven fibers can comprise or consist of an elastomer, in particular a polyurethane. By using elastomers in the nonwoven fibers, the clothing can expand better again after passing through the press nip. As a result, the dewatering property of the clothing remains at a high level for longer, which offers economic advantages for the operator. In particular, in the area of the seam and the join region or regions, nonwoven fibers made of elastomer are advantageous. Here, their use is also advantageous since the elastic action further reduces the marking tendency of these points.

Finally, in advantageous embodiments of the clothing, provision can also be made for at least one strip-like, flow-impeding element to be provided in the area of the seam, which is configured such that the permeability for air and/or water in the area of the seam is substantially the same as in the rest of the clothing.

This flow-impeding element can be implemented in various ways. For example, it can be formed as a band of woven or nonwoven material. Alternatively, it can be a membrane, a film or a polymer foam. The element can also be implemented in the form of a cured liquid resin. Here, those skilled in the art will readily arrive at further suitable implementation forms.

The invention will be described in more detail below by using schematic sketches, not to scale.

Figures 1a to 1c show, schematically, the structure and the production of a base structure having a two-layer laminate structure for use in a clothing according to various embodiments of the invention.

Figures 2a to 2c show, schematically, the structure and the production of a base structure having a two-layer laminate structure for use in a clothing according to further embodiments of the invention.

Figure 3 shows a clothing according to one aspect of the invention.

Figure 4 shows a seam loop of a clothing according to one aspect of the invention.

Figure 5 shows a possible embodiment of a joint.

Figure 1a shows a single flat-woven element 2 having a first long-side end 21 and a second long-side end 22, in plan view. The points 31 and 32 are the chosen folding points 31, 32, from which the seam loops 41, 42 are formed. Figure 1b shows the flat-woven element 2 once more in a side view.

At the folding points 31, 32, one or more CD threads can be removed in each case.

As shown in figure 1c, to produce the base structure the flat-woven element 2 is folded at folding points 31, 32, and the folded parts are again laid on the flat-woven element 2. A two-layer laminate structure 1 is thus produced. The long-side ends 21, 22 can overlap, touch or, as shown in figure 1c, have a small distance from each other in the region of the join 20. In various embodiments of the invention, the join 20 can be embodied as a joint 200 at which two long-side ends 21, 22 are connected to each other. An advantageous joining method is welding, in particular ultrasonic and laser transmission welding. To improve

stability, in particular during the processing, the two layers of the two-layer laminate structure 1 can be connected to each other, in particular sewn, at fixing points 110.

Figure 2a shows a two-layer laminate structure 1 which comprises two flat-woven elements 2, 2a. The seam loops 41, 42 are formed here by the MD threads 10 of the first flat-woven element 2. The second flat-woven element 2a is arranged in such a way that its first long-side end 21a forms a join area with the second long-side end 22 of the first flat-woven element 2, while its second long-side end 22a forms a join area with the first long-side end 21 of the first flat-woven element 2. These join areas 20 can once more be embodied as joints 200.

To improve stability, in particular during the processing, the second flat-woven element 2a can be connected to the first flat-woven element 2, in particular sewn, at fixing points 110.

Figure 2b shows a further embodiment of a two-layer laminate structure 1 which comprises two flat-woven elements 2, 2a. It differs from the structure illustrated in figure 2a in that a seam loop 41 is formed by MD threads 10 of the first flat-woven element 2, while the second seam loop 42 is formed by MD threads 10 of the second flat-woven element 2a. The two flat-woven elements 2, 2a can be the same, in particular also equally long. Alternatively, however, provision can also be made for them to differ in one or more features, in particular in length.

Figure 2c shows a further embodiment of a two-layer laminate structure 1, which comprises three flat-woven elements 2, 2a, 2b.

Figure 3 shows an embodiment of a clothing according to one aspect of the invention. Here, nonwoven layers 5a, 5b, 5c,

5d, are applied to the two-layer laminate structure 1 from figure 1c. These are usually fixed by needling. Otherwise, a further connection of the two layers of the two-layer laminate structure 1 to each other is carried out by the needling.

Figure 4 shows a seam loop 42, formed from an MD thread 10. The MD thread 10 is embodied as a round monofilament here. A nonwoven layer 15 is provided on the upper side of the clothing. To determine the LD/MDYD ratio, a circle is inscribed in the seam loop 42. This is the largest circle which can be inserted completely into the seam loop 42. The determination of such circles and their diameters is a familiar geometric practice. In commercially available microscopes, such a measurement is also contained within the functional scope of the operating software. In the clothings according to this invention, the seam loops are also vertical or largely vertical, so that the problem of possible distortion does not occur.

The diameter of the circle in the case of figure 4 is 1200 µm. The diameter of the MD thread is around 340 µm. The resultant LD/MDYD ratio is therefore 1200/340 = 3.5. A clothing having such seam loops thus fulfills the feature of the characterizing part of claim 1.

In figure 5, a detail of a joint 200 which is produced by means of laser transmission welding is illustrated by way of example. The transparent joining partners 100, 105 are connected to each other here by means of a connecting element 120. In figure 5, the connecting element 120 is embodied by way of example as a black thread 120. The transparent joining partners 100, 105 can be, for example, MD threads 10 of long-side ends 21, 22 of one or two flat-woven elements 2, 2a, 2b. It can be seen that although the connecting element 102 has been deformed noticeably by the welding operation, the transparent joining partners 100, 105 are largely structurally undamaged. Because of this property,

connections produced by means of laser transmission welding can also be distinguished from other welded connections.

Patent Claims

1. A clothing, in particular a seam felt for a machine for producing a fibrous material web, in particular paper, board, tissue or pulp web, comprising a base structure which comprises or consists of a two-layer laminate structure (1) formed from one or more flat-woven elements (2, 2a, 2b), wherein the laminate structure (1) has MD threads (10) which form seam loops (41, 42) at the two end sides of the base structure, and the two layers of the laminate structure (1) are connected to each other via the seam loops (41, 42), and wherein the clothing is made endless by connecting its end sides by means of a seam, and this seam is made by interengaging the seam loops (41, 42) of the two end sides and the insertion of an insertion element, **characterized in that** the diameter (LD) of the seam loops (41, 42) and the diameter (MDYD) of the associated MD threads (10) has a ratio LD/MDYD between 2.5 and 4, in particular between 2.7 and 3.6.

2. The clothing as claimed in claim 1, **characterized in that** at least one, in particular all, of the flat-woven elements (2, 2a, 2b) have floats which extend over two or more threads.

3. The clothing as claimed in one of the preceding claims, **characterized in that** each of the flat-woven elements (2, 2a, 2b) has a first and a second long-side end (21, 22, 21a, 22a), and the two-layer laminate structure (1) has at least one joint (200), at which two long-side ends (21, 22, 21a, 22a) are connected to each other, wherein these long-side ends (21, 22, 21a, 22a) can belong to the same flat-woven element (2, 2a, 2b) or to different flat-woven elements (2, 2a, 2b).

4. The clothing as claimed in claim 3, **characterized in that** the connection of the two long-side ends (21, 22, 21a,

22a) is made by a welded connection, in particular a welded connection produced by means of laser transmission welding.

5. The clothing as claimed in either of claims 3 and 4, **characterized in that** the extent of the at least one joint (200) in the machine direction (MD) is less than 15 mm, in particular less than 5 mm.

6. The clothing as claimed in one of claims 3 to 5, **characterized in that** the at least one joint (200) is made by connecting elements (120), in particular connecting threads (120), which are welded to at least one, preferably both, long-side ends (21, 22, 21a, 22a).

7. The clothing as claimed in claim 6, **characterized in that** connecting threads (120) which are arranged in the CD direction of the clothing are used as connecting elements (120), at most three connecting threads (120), in particular at most two connecting threads (120), being provided for a joint (200).

8. The clothing as claimed in claim 7, **characterized in that** one or more of the connecting threads (120) are woven with MD threads (10) of at least one long-side end (21, 22, 21a, 22a).

9. The clothing as claimed in one of the preceding claims, **characterized in that** the MD threads (10) are embodied as monofilaments, in particular as monofilaments with a round cross section.

10. The clothing as claimed in one of the preceding claims, **characterized in that** the diameter of the MD threads (10) is between 0.15 mm and 0.7 mm, in particular between 0.3 mm and 0.5 mm.

11. The clothing as claimed in one of the preceding claims, **characterized in that** the loop density of the seam is between 64% and 90%, in particular between 72% and 86%.

12. The clothing as claimed in one of the preceding claims, **characterized in that** the clothing has one or more layers (5a, 5b, 5c, 5d) of nonwoven fibers, at least on its upper side contacting the paper.

13. The clothing as claimed in claim 12, **characterized in that** at least some of the nonwoven fibers comprise or consist of an elastomer, in particular a polyurethane.

14. The clothing as claimed in one of the preceding claims, **characterized in that** in the area of the seam, at least one strip-like flow-impeding element is provided, which is configured such that the permeability for air and/or water in the area of the seam is substantially the same as in the rest of the clothing.

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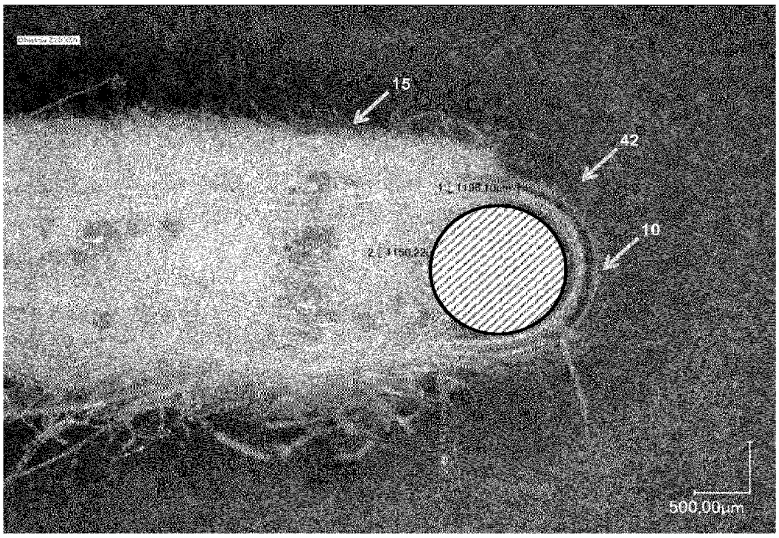
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(54) **Title:** COVERING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB

(54) **Bezeichnung:** BESPANNUNG FÜR EINE MASCHINE ZUR HERSTELLUNG EINER FASERSTOFFBAHN

Figur 4



(57) **Abstract:** The invention relates to a covering, in particular a seam felt for a machine for producing a fibrous material web, in particular a paper, paperboard, tissue or pulp stock web, comprising a basic structure including or consisting of a two-layer laminate structure formed of one or more flat-woven elements, wherein the laminate structure has MD threads which form seam loops at the two end sides of the basic structure, and the two layers of the laminate structure are connected to one another via the seam loops, and wherein the covering is made continuous by connecting the end sides thereof by means of a seam, and this seam is executed by engaging the seam loops of both end sides and introducing an insertion element. According to the invention, the diameter of the seam loops (LD) and the diameter of the associated MD threads (MDYD) have a ratio (LD/MDYD) of between 2.5 and 4, in particular between 2.7 and 3.6.

[Fortsetzung auf der nächsten Seite]

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GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), eurasisches (AM, AZ, BY, KG, KZ, RU, TJ, TM), europäisches (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

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— *mit internationalem Recherchenbericht (Artikel 21 Absatz 3)*

(57) Zusammenfassung: Bespannung, insbesondere Nahtfilz für eine Maschine zur Herstellung einer Faserstoffbahn, insbesondere einer Papier~, Karton~, Tissue~ oder Zellstoffbahn, umfassend eine Grundstruktur, die eine zweilagige Laminatstruktur aus einem oder mehreren flachgewebte Elemente umfasst oder daraus besteht, wobei die Laminatstruktur MD-Fäden aufweist, welche an den beiden stirnseitigen Enden der Grundstruktur Nahtschlaufen ausbilden und die beiden Lagen der Laminatstruktur über die Nahtschlaufen miteinander verbunden sind, und wobei die Bespannung durch Verbinden ihrer stirnseitigen Enden mittels einer Naht endlos gemacht ist, und diese Naht durch Ineinandergreifen der Nahtschlaufen beider stirnseitiger Enden und das Einführen eines Steckelements ausgeführt ist. Erfindungsgemäß ist vorgesehen, dass der Durchmesser der Nahtschlaufen (LD) und der Durchmesser der zugehörigen MD-Fäden (MDYD) ein Verhältnis LD/MDYD zwischen 2.5 und 4, insbesondere zwischen 2.7 und 3.6 aufweisen.

BESPANNUNG FÜR EINE MASCHINE ZUR HERSTELLUNG EINER FASERSTOFFBAHN

Die Erfindung betrifft eine Bespannung, insbesondere Nahtfilz für eine Maschine zur Herstellung einer Faserstoffbahn gemäß dem Oberbegriff des Anspruchs 1.

Bespannungen, die in Papiermaschinen zum Einsatz kommen, bestehen üblicherweise aus endlosen Bandschlaufen. Diese Bandschlaufen werden im Betrieb der Maschine kontinuierlich über eine Vielzahl von Stütz- und Leitelementen im Kreis geführt und stehen dabei stets unter eine Zugspannung. Zudem sind sie Belastungen durch Pressen, Saugelementen und ähnlichem ausgesetzt.
Um diesen Belastungen dauerhaft standhalten zu können, weisen solche Bespannungen häufig eine gewebte Grundstruktur auf.

Es sind verschiedene Möglichkeiten bekannt, eine gewebte Grundstruktur in der für die Bespannung benötigten Endloskonfiguration herzustellen. Am häufigsten werden solche Strukturen rund-gewebt. Dabei wird direkt auf dem Webstuhl eine schlauchförmige Gewebestruktur erzeugt. Beim Einsatz in einer Papiermaschine wird dieser Schlauch gedreht, so dass sie Schussfäden des Webstuhls zu dem Maschinenrichtungs-Fäden (MD-Fäden) der Bespannung werden.
Diese Art des Webens ist jedoch sehr zeitaufwändig. Zudem muss beim Weben bereits die benötigte Länge der Bespannung exakt bekannt sein. Ein Weben ‚auf Vorrat' ist nicht möglich.

Um eine effizientere Art der Herstellung zu ermöglichen, schlägt die EP 0 425 523 die Verwendung von flach gewebten Bahnen vor. Diese werden in der doppelten Länge der benötigten Bespannung bereitgestellt. Durch Umfalten und Aufeinander-ablegen der längsseitigen Enden wird eine zweilagige Laminatstruktur erzeugt. Durch Entfernen von CD-Fäden an den Faltstellen werden Nahtschlaufen erzeugt. Durch Ineinandergreifen der Nahtschlaufen beider stirnseitiger Enden und das Einführen eines Steckelements kann diese Grundstruktur endlos gemacht werden. Im Gegensatz zu den rundgewebten Strukturen sind hier die Kettfäden des Gewebes die MD-Fäden der Bespannung. Auf diese Weise lassen sich Nahtbespannungen sehr

effizient herstellen. Insbesondere kann ein Flachgewebe bereits auf Vorrat produziert und als Rolle gelagert werden, wenn die Dimensionen der fertigen Bespannung noch nicht bekannt sind. Zur Fertigung der Bespannung muss dann nur die benötigte Länge von der Rolle abgewickelt und in der Breite gegebenenfalls auf die Bespannungsbreite gekürzt werden.

Diese Art der Herstellung bringt jedoch auch Nachteile mit sich.
Zum einen liegen diese im Bereich der Naht. .An der Nahtstelle unterscheiden sich die Eigenschaften von denen des restlichen Teils der Bespannung. Häufig ist hierbeispielsweise die Permeabilität für Wasser und Luft höher, als im Rest der Bespannung. Dadurch kann es zu einer Qualitätseinbuße durch Markierungen im Papier kommen.
Eine weitere kritische Stelle ist der sogenannte „Join“. Durch das Umfalten kommen die beiden längsseitigen Enden auf einer Seite der Grundstruktur zu liegen. Sie können dabei auf Stoß, überlappend oder mit Abstand angeordnet sein. Auch an dieser Stelle unterscheiden sich die Eigenschaften der Grundstruktur vom übrigen Bereich, wodurch Markierungen im Papier entstehen können.

Es ist daher die Aufgabe der vorliegenden Erfindung, eine Bespannung anzugeben, die schnell und ökonomisch herstellbar sowie einsetzbar ist, und gleichzeitig die aus dem Stand der Technik bekannten Qualitätsmängel überwindet.

Diese Aufgabe wird vollständig gelöst durch eine Bespannung nach dem Kennzeichen des Anspruchs 1.

Zum besseren Verständnis der Erfindung seien noch einige Erläuterungen und Definitionen vorangestellt, welche im Rahmen dieser Anwendung verwendet werden.

Unter MD-Fäden sollen Fäden verstanden werden, die in Längsrichtung der Grundstruktur, bzw. der Bespannung orientiert sind, oder von dieser um maximal 10° abweichen. (MD – machine direction)

Unter CD-Fäden sollen Fäden verstanden sind, die in Querrichtung der Grundstruktur bzw. der Bespannung orientiert sind, oder von dieser um maximal 10° abweichen. (CD-cross direction).

Im Rahmen dieser Anmeldung wird der Begriff ‚Durchmesser eines Fadens' verwendet. Bei runden Fäden ist dieser Begriff wohldefiniert.
Für Monofilamente, die von der runden Form abweichen, oder auch für aus mehreren Monofilamenten gezwirnte Fäden soll unter dem Durchmesser des Fadens der Durchmesser desjenigen Kreises verstanden werden, welcher dieselbe Fläche aufweist, wie der Querschnitt des Fadens, bzw. wie die Summe der Querschnitte der einzelnen Monofilamente.
Für ein Monofilament mit quadratischem Querschnitt und 1 mm Kantenläge ergäbe sich somit der folgende Durchmesser D:

$$A = 1[mm^2] = \pi r^2 \Rightarrow r = \sqrt{\frac{1}{\pi}}\,[mm] \Rightarrow D = 2r \approx 1{,}12\,[mm]$$

Zur Bestimmung des Durchmessers einer Nahtschlaufe wird der größte Kreis ermittelt, welcher sich vollständig in die Nahtschlaufe einfügen lässt. Der Durchmesser dieses Kreises wird dann als der Durchmesser der Nahtschlaufe betrachtet.

Es wird eine Bespannung, insbesondere ein Nahtfilz für eine Maschine zur Herstellung einer Faserstoffbahn, insbesondere einer Papier~, Karton~, Tissue~ oder Zellstoffbahn vorgeschlagen. Die Bespannung umfasst eine Grundstruktur, die eine zweilagige Laminatstruktur aus einem oder mehreren flachgewebte Elemente umfasst oder daraus besteht.

Dabei weist die Laminatstruktur MD-Fäden auf, welche an den beiden stirnseitigen Enden der Grundstruktur Nahtschlaufen ausbilden und über die die beiden Lagen der Laminatstruktur miteinander verbunden sind. Die Bespannung ist durch Verbinden ihrer stirnseitigen Enden mittels einer Naht endlos gemacht. Diese Naht ist durch das

Ineinandergreifen der Nahtschlaufen beider stirnseitiger Enden und das Einführen eines Steckelements gebildet.

Erfindungsgemäß ist dabei vorgesehen, dass der Durchmesser der Nahtschlaufen (LD-loop diameter) und der Durchmesser der zugehörigen MD-Fäden (MDYD-MD yarn diameter) ein Verhältnis LD/MDYD zwischen 2.5 und 4, insbesondere zwischen 2.7 und 3.6 aufweisen.

Versuche der Anmelderin haben ergeben, dass bei den erfindungsgemäßen LD/MDYD-Verhältnissen die entstehende Naht in vielerlei Hinsicht optimal ist.
Zum einen weist sie eine sehr hohe Festigkeit auf, ohne die ein erfolgreicher Einsatz z.B. als Nahtfilz nicht möglich ist.
Zudem ist das Schließen der Naht sehr einfach möglich. Die Naht einer Nahtbespannung wird üblicherweise in der Papiermaschine selbst durch Einziehen eines Steckelements, auch Pintle oder Steckdraht genannt, geschlossen. Dieses Einziehen geschieht händisch, und kann besonders bei breiten Maschinen ein langwieriger Prozess sein. Dadurch, dass der Schlaufendurchmesser im Verhältnis zum MD-Faden Durchmesser nicht zu klein wird, wird das Einziehen des Steckdrahtes erleichtert. Zu diesem ergonomischen Vorteil verkürzt sich die Zeit für das Einziehen einer neuen Bespannung, was für den Betreiber der Anlage ökonomische Vorteile bietet.
Jedoch darf der Durchmesser, bzw. das LD/MDYD Verhältnis auch nicht zu groß werden. Zu große Schlaufen können einerseits zu mechanischen Markierungen im Papier führen, indem sich die Biegungen der Schlaufe z.B. beim Durchlaufen eines Pressnips in das Papier einprägen. Andererseits bedeuten große Schlaufen auch, dass der Nahtbereich selbst vergleichsweise groß wird. Da sich dieser Nahtbereich strukturell vom Rest der Bespannung unterscheidet, und insbesondere auch eine veränderte Permeabilität für Wasser und/oder Luft aufweist, besteht im Nahtbereich die Gefahr von hydraulischen Markierungen im Papier aufgrund einer unterschiedlichen Entwässerung. Aus diesem Grund ist es wünschenswert, den Naht Bereich so klein wie möglich zu halten.

Der erfindungsgemäße Bereich LD/MDYD zwischen 2.5 und 4, insbesondere zwischen 2.7 und 3.6 hat sich hier als der optimale Kompromiss erwiesen.
Insbesondere hat die Anmelderin erkannt, dass als charakterisierende Größe nicht der absolute Schlaufendurchmesser (in mm), sondern der Relativwert LD/MDYD herangezogen werden muss.

Vorteilhafte Ausführungen der Erfindung sind in den abhängigen Ansprüchen beschrieben.

Es kann vorgesehen sein, dass die Grundstruktur neben der zweilagigen Laminatstruktur noch weitere Komponenten umfasst. So kann z.B. noch eine weitere Gewebelage und/der eine Gelegelage und/oder eine Vlieslage vorgesehen sein. Die zusätzlichen Komponenten können außen auf der zweilagigen Laminatstruktur angeordnet sein. Alternativ oder zusätzlich kann eine zusätzliche Komponente auch zwischen den beiden Lagern der zweilagigen Laminatstruktur angeordnet sein.

Die beiden Lagen der zweilagigen Laminatstruktur können aus einem einzigen flachgewebten Element gebildet sein. Dieses Flachgewebe weist – zumindest in etwa -die doppelte Länge der späteren Bespannung auf. Durch Falten und Ablegen der beiden Enden des Flachgewebes auf den Mittelteil des Flachgewebes entsteht eine doppellagige Struktur wobei an sich den Faltstellen die Nahtschlaufen ausbilden. Die längsseitigen Enden des flachgewebten Elementes können dabei in einem sogenannten ‚Join'-Bereich auf Stoß, überlappend oder mit Abstand angeordnet sein. Der Überlapp bzw. der Abstand beträgt dabei vorteilhafterweise weniger als 5cm, insbesondere weniger als 2 cm.

Alternativ können die beiden Lagen aus mehreren flachgewebten Elementen gebildet sein. Dabei können alle flachgewebten Elemente dieselbe Länge aufweisen. Es kann jedoch auch vorgesehen sein, dass diese flachgewebten Elemente unterschiedliche Längen aufweisen. Auch in diesen Ausführungen sind die Nahtschlaufen durch umschlagen von einem oder zwei flachgewebten Elementen gebildet. Auf diese

Weise sind die beiden Lagen der Laminatstruktur auch hier durch die Nahtschlaufen miteinander verbunden.
Umfasst die Grundstruktur mehrere flachgewebte Elemente so entstehen auch mehrere Join-Bereiche, für die dasselbe gilt, wie oben für den Fall eines Join-Bereiches beschrieben.
Bei der Verwendung von mehreren flachgewebten Elementen besteht die Möglichkeit, dass alle Elemente aus demselben Gewebe bestehen. Alternativ kann aber auch vorgesehen sein, dass sich die Elemente in einem oder mehreren Merkmalen unterscheiden. Dabei kann es sich bei den Merkmalen um das Webmuster handeln, das Material, den Durchmesser bzw. den Aufbau der MD-, bzw. CD-Fäden oder andere Kennzeichen des Gewebes, die dem Fachmann bekannt sind.

Eines oder alle der flachgewebten Elemente können beispielsweise als ‚plain weave', also mittels einer Leinwandbindung realisiert sein. Diese Art des Gewebes ist sehr einfach und schnell herzustellen, was ökonomisch vorteilhaft ist.

Ein bekannter Effekt bei zweilagigen Gewebestrukturen ist jedoch der Moiré Effekt. Dieser tritt bei zweilagigen Leinwandgeweben verstärkt auf. Zur Reduzierung dieses Effektes, und damit auch zur Reduzierung der Gefahr von Markierungen im Papier, die durch diesen Effekt ausgelöst werden, kann es vorteilhaft sein, wenn zumindest eines oder alle der flachgewebten Elemente kein Leinwandgewebe sind.
Insbesondere kann es hierfür vorteilhaft sein, wenn eines oder alle der flachgewebten Elemente Flottierungen aufweist, die sich über zwei oder mehrere Fäden erstrecken. Somit kann die Stärke des Moiré-Effekts reduziert werden. Trotzdem bleibt der Vorteil der einfachen Erzeugung der Nahtschlaufen erhalten.

Als Steckelement können alle aus dem Stand der Technik bekannten Steckelemente verwendet werden. Insbesondere können Steckdrähte aus einem oder mehreren Filamenten eingesetzt werden.

Die beiden Lagen der zweilagige Laminatstruktur können vorteilhafterweise durch Vernähen oder andere geeignete Techniken miteinander verbunden werden. Bevorzugt können solche Verbindungen in der Nähe der Nahtschlaufen und/oder in der Nähe der Join-Bereiche vorgesehen sein.

In bevorzugten Ausführungen kann vorgesehen sein, dass jedes der flachgewebten Elemente ein erstes und ein zweites längsseitiges Ende aufweist, und die zweilagige Laminatstruktur zumindest eine Fügestelle aufweist, an der zwei längsseitige Enden miteinander verbunden sind. In dieser Ausführung ist also zumindest einer der Join-Bereiche als Fügestelle ausgeführt. Dabei können die gefügten längsseitigen Enden, wie oben beschrieben zu demselben flachgewebten Element oder zu verschiedenen flachgewebten Elementen gehören können.

Die Verbindung an der bzw. den Fügestellen kann durch eine Vielzahl von bekannten Verfahren erfolgen. Insbesondere kann die Verbindung an der zumindest einen Fügestelle durch eine Klebeverbindung und/oder eine Schweißverbindung realisiert ist. So sind beispielsweise mittels Ultraschall oder mittels eines Lasers geschweißte Fügestellen möglich. Besonders vorteilhaft ist das Verschweißen mittels eines NIR-Lasers im Transmissionsschweißverfahren. Das Lasertransmissionssschweißen ist insbesondere deshalb vorteilhaft, da die üblichen Polyamidgarne des Gewebes für Laserlicht in einem weiten Frequenzbereich transparent sind, und sehr einfach durch unter Verwendung absorbierender, z.B. schwarzer Verbindungsfäden verschweißt werden können. Es ist auch möglich, die Fügestelle in Form einer Webnaht auszuführen. Solche Webnähte werden beispielsweise verwendet, um gewebte Formiersiebe endlos zu machen. Webnähte sind zwar häufig aufwändiger herzustellen, als Klebe- oder Schweißverbindungen, jedoch kann eine derartige Fügestelle eine sehr hohe Festigkeit aufweisen .

Ein Verbinden der längsseitigen Enden durch eine Fügestelle bietet eine Reihe von Vorteilen. Zum einen wird die Zugfestigkeit der zweilagigen Laminatstruktur dadurch erhöht. Die Fügestelle dient zudem auch dazu, die losen Enden der MD Fäden an den längsseitigen Enden besser zu fixieren. Ohne eine solche Fixierung kann es bei

manchen Anwendungen dazu kommen, dass sich diese Enden während des Betriebs der Bespannung lösen, und durch eventuell vorhandene Vlieslagen etc. hindurch an die Oberfläche der Bespannung transportiert werden. Dort können diese losen Enden zu Beschädigungen und Markierungen in der produzierten Faserstoffbahn führen. Durch die Fixierung der losen Enden durch die Fügestelle kann ein Herausarbeiten dieser Enden ganz oder weitgehend vermieden werden.

Bevorzugt kann vorgesehen sein, dass die Ausdehnung der zumindest einen Fügestelle in Maschinenrichtung (MD) weniger als 15mm, weniger als 10mm, insbesondere weniger als 5mm beträgt. Da an den Join- bzw. Fügestellen auch wieder die Gefahr unterschiedlicher Entwässerungsverhältnisse verglichen mit dem Rest der Bespannung besteht, ist eine geringe Ausdehnung dieser Bereiche vorteilhaft zur Reduzierung der Markierungsneigung.
Während bisher im Stand der Technik versucht wurde, den Join- bzw.- Fügebereich dem Rest der Bespannung in wesentlichen Eigenschaften wir Dicke und Permeabilität so ähnlich wie möglich zu machen, geht diese Ausführung der Erfindung einen anderen Weg. Dabei wird in Kauf genommen, dass im Fügebereich die Eigenschaften der Grundstruktur bzw. der Bespannung von Rest der Bespannung unterscheiden können. Stattdessen wird darauf abgezielt, diesen unterschiedlichen Bereich in MD-Richtung so klein wie möglich zu halten. Insbesondere bei Filzen, bei denen die aufgebrachten Vlieslagen als eine Art Diffusor wirken, kann die Unterschiedliche Entwässerung in diesem sehr kleinen Bereich nicht mehr im Papier als Markierung wahrgenommen werden.

Vorteilhaft zur Unterstützung dieses Effektes kann es sein, wenn die zumindest eine Fügestelle, insbesondere alle Fügestellen, durch Verbindungselemente, insbesondere Verbindungsfäden realisiert sind, welche mit zumindest einem, vorzugsweise beiden längsseitigen Enden verschweißt sind.

Insbesondere können als Verbindungselemente Verbindungsfäden verwendet sind, welche in CD-Richtung der Bespannung angeordnet sind, wobei für eine Fügestelle

maximal drei Verbindungsfäden, insbesondere maximal zwei Verbindungsfäden vorgesehen sind.

Wird beispielsweise ein Verbindungsfaden quer über die MD-Fäden der beiden zu fügenden längsseitigen Enden gelegt, und mit diesen verschweißt, so ergibt sich bereits mit einem oder zwei solcher Fäden eine sehr feste Fügeverbindung. Somit ist die Ausdehnung der Fügestelle in MD Richtung extrem klein, und die Auswirkung z.B. einer unterschiedlichen Permeabilität in diesem Bereich ist im Papier nicht mehr erkennbar.

Alternativ oder zusätzlich kann auch vorgesehen sein, dass einer oder mehrere der Verbindungsfäden mit MD-Fäden zumindest eines längsseitigen Endes verwoben sind.

Sehr geeignet ist dafür beispielsweise das Lasertransmissionssschweißen, da die üblichen Polyamidgarne des Gewebes für Laserlicht in einem weiten Frequenzbereich -speziell zwischen 800 nm und 1000 nm- transparent sind, und sehr einfach durch unter Verwendung absorbierender, z.B. schwarzer Verbindungsfäden verschweißt werden können. Der transparente Fügepartner heizt sich bei diesem Fügeverfahren im Wesentlichen nur an der Oberfläche auf. Die Struktur dieses transparenten Fügepartners bleibt dabei weitgehend erhalten. Dies ist beispielsweise vorteilhaft, wenn der transparente Fügepartner ein MD-Faden ist, welcher in der fertigen Bespannung eine Zugbelastung ausgesetzt ist. Dieser wir durch das Lasertransmissionssschweißen nicht wesentlich geschwächt. Eine derartige Fügestelle besitzt auch eine ausreichende Festigkeit, um Verarbeitungsschritte im weiteren Verlauf der Herstellung, insbesondere die Vernadelung zu überstehen. Im Gegensatz dazu sind mittels Ultraschall geschweißte Fügestellen häufig sehr spröde und brüchig und werden durch das Vernadeln zumindest teilweise zerstört. Durch die Zerstörung der Fügestelle können sich wieder einzelne Fadenenden oder Fadenteile lösen und aus der Bespannung herausragen, wodurch Markierungen erzeugt oder die Faserstoffbahn beschädigt werden kann.

Statt Fäden können auch andere Arten von Verbindungselementen eingesetzt werden, wie z.B. gewebte oder nicht gewebte Bändchen, Streifen aus

Polymermaterial oder ähnlichem. Nach dem oben Gesagten ist es generell vorteilhaft, wenn Verbindungselemente in MD-Richtung nur eine geringe Ausdehnung, insbesondere unter 5mm, unter 2mm oder noch besser unter 1mm.

In vorteilhaften Ausführungen kann vorgesehen sein, dass die MD-Fäden die insbesondere zum Formen der Nahtschlaufen verwendet werden, als Monofilamente, insbesondere als Monofilamente mit rundem Querschnitt ausgeführt sind.
Weiterhin kann es vorteilhaft sein, wenn der Durchmesser der MD-Fäden zwischen 0.15mm und 0.7mm, insbesondere zwischen 0.3mm und 0.5mm beträgt.

Neben dem LD/MDYD Verhältnis kann es für die Eigenschaften des Nahtbereiches auch vorteilhaft sein, die sogenannte Schlaufendichte in der Naht anzupassen.

Bei der Bestimmung der Nahtschlaufendichte wird zuerst die Anzahl der Nahtschlaufen pro Längeneinheit ermittelt. Bei einem Gewebe mit einer MD-Fadendichte von 64 Garnen/100mm weist der Nahtbereich durch das Ineinandergreifen der MD-Fäden beider Enden die doppelte Anzahl, also 128 Garne/100mm auf. Multipliziert man die Anzahl der Fäden mit ihrem Durchmesser, so erhält man die Nahtschlaufendichte (Angabe in Prozent) als ein Maß für die Abdeckung des Nahtbereiches durch MD-Fäden. Werden im obigen Beispiel Monofilamente mir einem Durchmesser von 0.5mm verwendet, so ergibt sich eine Nahtschlaufendichte von $\frac{128/0{,}5[mm]}{100\,[mm]} = 64\%$ $\frac{128/0{,}5[mm]}{100\,[mm]} = 64\%$

Es sei an dieser Stelle angemerkt, dass sich die Nahtschlaufendichte einer Bespannung während ihres Herstellungsprozesses ändern kann. So kann es durch thermische Verfahrensschritte zu einem Schrumpf der Bespannung in Querrichtung kommen. Daher ist die Nahtschlaufendichte vor dem ersten thermischen Verfahrensschritt meist niedriger, üblicherweise zwischen 55% und 80%, während sie in der fertigen Bespannung dann höher ist. Die in dieser Anmeldung angegebenen Werte der Nahtschlaufendichte beziehen sich, soweit nicht anderweitig angegeben, auf die fertige Bespannung

In einer bevorzugten Ausführung kann vorgesehen sein, dass die Schlaufendichte der Naht zwischen 64% und 90%, insbesondere zwischen 72% und 86%, speziell zwischen 78% und 82% beträgt. Als besonders vorteilhaft haben sich Werte von 80%, 81%, 82%, 83%, 84% und 85% herausgestellt.

Da tendenziell die Permeabilität der Naht höher ist, als im Rest der Bespannung, kann durch eine vergleichsweise hohe Nahtschlaufendichte die Permeabilität der Naht verringert werden. Eine Erhöhung der Schlaufendichte über 90% hinaus kann jedoch dazu führen, dass die eingangs erwähnte einfache Nahtbarkeit der Bespannung teilweise verloren geht, da es schwieriger wird, die Nahtschlaufen ineinandergreifen zu lassen. Ähnlich wie beim LD/MDYD Verhältnis ist auch der hier angeführte Bereich der Nahtschlaufendichte ein in gewissem Sinne optimaler Bereich für zwei gegenläufige Anforderungen.

In diesem Zusammenhang soll noch einmal auf die Vorteile hingewiesen werden, wenn die Grundstruktur aus Flachgewebe aufgebaut ist. Bei klassischen, rundgewebten Grundstrukturen wir das Gewebe zur Verwendung in der Bespannung um 90° gedreht. Die Kettfäden des Webstuhls werden die CD-Fäden der Bespannung und die Schussfäden die MD Fäden. Bei der Verwendung von Flachgeweben ist dies in den meisten Fällen nicht der Fall. Hier wird das Gewebe nicht gedreht, so dass die MD Fäden der Grundstruktur den Kettfäden des Webstuhls entsprechen. Dies hat Konsequenzen für die jeweilige Fadendichte. Beim Weben werden die Schussfäden im Wesentlichen gerade eingebracht, während die Kettfäden jeweils von oberhalb des Schussfadens nach unterhalb des Schussfadens wechseln. Dies führt beispielsweise bei der Leinwandbindung dazu, dass zwischen zwei benachbarten Schussfäden jeweils die sich kreuzenden Kettfäden verlaufen. Aus diesem Grund können benachbarte Schussfäden nicht beliebig nahe beieinander liegen. Bei den Kettfäden besteht eine derartige Restriktion nicht, da zwischen ihnen keine sich kreuzenden Schussfäden verlaufen. Daher können benachbarte Kettfäden im Prinzip beliebig nahe beieinander angeordnet sein.

Da, wie oben beschrieben, bei Flachgeweben die Schussfäden den MD-Fäden der Bespannung entsprechen, lässt sich bei der Verwendung von Flachgeweben eine höhere MD Fadendichte, und damit auch eine höhere Schlaufendichte erzielen.

Die in dieser Anmeldung beschriebenen Schlaufendichten von mehr als 64%, insbesondere mehr als 72% oder 78% lassen sich mit Rundgeweben entweder gar nicht erzielen, oder mittels extremer Webbedingungen wie einer stark erhöhten Kettspannung, welche zu einem stark beschleunigten Verschleiß des Webstuhls führen.

Mittels dieser Ausführung der Erfindung ist es also möglich, eine Bespannung mit einer Naht zu realisieren, die– durch die hohe Schlaufendichte – eine geringe Permeabilität aufweist, und trotzdem –durch das optimale LD/MDYD-Verhältnis- leicht zu schließen ist. Andere bekannte Methoden zur Reduzierung der Nahtpermeabilität, wie z.B. dem Einfügen eines strömungsbehindernden Elements („scrim“) in den Nahtbereich, führen hingegen zu einem schwierigeren Schließen der Naht.

In vorteilhaften Ausführungen kann der Nahtbereich der Bespannung –nach dem Schließen der Naht mittels des Steckelements - eine Permeabilität aufweisen, die zwischen 80% und 130%, insbesondere zwischen 90% und 120% der Permeabilität der Bespannung in einem nahtfernen Bereich entspricht.

In einer bevorzugten Ausführung weist die Bespannung zumindest an ihrer Papier berührenden Oberseite eine oder mehrere Lagen aus Vliesfasern auf. Insbesondere kann es sich bei der Bespannung um einen Pressfilz handeln. Zudem können auch an der Walzen berührenden Unterseite der Bespannung eine oder mehrere Lagen aus Vliesfasern vorgesehen sein.

Vorteilhafterweise ist dabei vorgesehen, dass ein Teil der Vliesfasern eine Faserfeinheit von 67dtex oder mehr aufweisen. Insbesondere können diese vergleichsweise groben Fasern in direkter Nachbarschaft zu der Grundstruktur angeordnet sein. Häufig werden sie als eine grobe Vlieslage aufgebracht und mit der Grundstruktur vernadelt.

Es können auch Vliesfasern mit einer Feinheit von 44 dtex und weniger verwendet werden. Insbesondere können diese vergleichsweise feinen Fasern an der papierberührenden Oberseite der Bespannung angeordnet sein. Diese feinen Fasern

können auf einer Vlieslage mit den oben erwähnten groben Fasern mit 67 dtex oder mehr angeordnet und mit ihnen vernadelt sein.
Hierdurch kann eine gute Verbindung der Vliesauflage mit der Grundstruktur sowie der einzelnen Vlieslagen untereinander erzielt werden.

In besonders vorteilhaften Ausführungen der Erfindung können zumindest einige der Vliesfasern ein Elastomer, insbesondere ein Polyurethan umfassen oder daraus bestehen. Durch die Verwendung von Elastomeren im Faservlies kann die Bespannung nach dem Durchlauf durch den Pressnip wieder besser expandieren. Dadurch bleibt die Entwässerungseigenschaft der Bespannung länger auf einem hohen Niveau, was für den Betreiber ökonomische Vorteile bietet. Insbesondere im Bereich der Naht und in dem bzw. den Join-Bereichen sind Vliesfasern aus Elastomer vorteilhaft. Hier ist ihre Verwendung auch deshalb vorteilhaft, weil die elastische Wirkung die Markierungstendenzen dieser Stellen weiter reduziert.

Schließlich kann in vorteilhaften Ausführungen der Bespannung auch vorgesehen sein, dass im Bereich der Naht zumindest ein streifenförmiges, strömungsbehinderndes Element vorgesehen ist, welches so eingerichtet ist, dass die Durchlässigkeit für Luft und/oder Wasser im Bereich der Naht im Wesentlichen dieselbe ist, wie in der übrigen Bespannung.
Dieses strömungsbehindernde Element kann auf verschiedene Arten realisiert sein. Beispielsweise kann es als Band aus gewebtem oder nicht gewebtem Material gebildet sein. Alternativ kann es eine Membran, eine Folie oder ein Polymerschaum sein. Das Element kann auch in Form eines gehärteten flüssigen Harzes realisiert sein Der Fachmann wird hier ohne weiteres noch auf weitere geeignete Realisierungsformen kommen können.

Im Folgenden wird die Erfindung anhand schematischer, nicht maßstäblicher Skizzen näher erläutert.

Figuren 1a bis 1c zeigen schematisch den Aufbau bzw. die Herstellung einer Grundstruktur mit einer zweilagigen Laminatstruktur zur Verwendung in einer Bespannung gemäß verschiedenen Ausführungen der Erfindung.

Figuren 2a bis 2c zeigen schematisch den Aufbau bzw. die Herstellung einer Grundstruktur mit einer zweilagigen Laminatstruktur zur Verwendung in einer Bespannung gemäß weiteren Ausführungen der Erfindung.

Figur 3 zeigt eine Bespannung nach einem Aspekt der Erfindung.

Figur 4 zeigt eine Nahtschlaufe einer Bespannung gemäß einem Aspekt der Erfindung.

Figur 5 zeigt eine mögliche Ausführung einer Fügestelle

Figur 1a zeigt ein einzelnes flachgewebtes Element 2 mit einem ersten längsseitigen Ende 21 und einem zweiten längsseitigen Ende 22. in der Draufsicht. Die Stellen 31 und 32 sind die gewählten Faltstellen 31, 32, aus denen die Nahtschlaufen 41,42 gebildet werden. Figur 1b zeigt das flachgewebte Element 2 noch einmal in einer Seitenansicht.

An den Faltstellen 31, 32 können jeweils ein oder mehrere CD Fäden entnommen werden.

Wie in Figur 1c gezeigt werden zur Herstellung der Grundstruktur das flachgewebte Element 2 an Faltstellen 31, 32 gefaltet, und die gefalteten Teile wieder auf das flachgewebte Element 2 abgelegt. So entsteht eine zweilagige Laminatstruktur 1. Die längsseitigen Enden 21, 22, können sich dabei im Bereich des Joins 20 überlappen, berühren oder, wie in Figur 1c gezeigt, einen kleinen Abstand zueinander aufweisen. Der Join 20 kann in verschiedenen Ausführungen der Erfindung als Fügestelle 200 ausgeführt sein, an der zwei längsseitige Enden 21, 22 miteinander verbunden sind. Eine vorteilhafte Fügemethode ist das Schweißen, insbesondere das Ultraschall- und das Lasertransmissionsschweißen. Zur Verbesserung der Stabilität insbesondere bei der Verarbeitung können die beiden Lagen der zweilagigen Laminatstruktur 1 an Fixierstellen 110 miteinander verbunden, insbesondere vernäht sein.

Figur 2a zeigt eine zweilagige Laminatstruktur 1, die zwei flachgewebte Elemente 2, 2a umfasst. Die Nahtschlaufen 41, 42 sind hier durch die MD-Fäden 10 des ersten

flachgewebten Elements 2 gebildet. Das zweite flachgewebte Element 2a ist so angeordnet, dass sein erstes längsseitiges Ende 21a mit dem zweiten längsseitigen Ende 22 des ersten flachgewebten Elementes 2 einen Join-Bereich ausbildet, während sein zweites längsseitiges Ende 22a mit dem ersten längsseitigen Ende 21 des ersten flachgewebten Elementes 2 einen Join-Bereich ausbildet. Diese Join-Bereiche 20 können wieder als Fügestellen 200 ausgeführt sein.
Zur Verbesserung der Stabilität insbesondere bei der Verarbeitung kann das zweite flachgewebte Element 2a an Fixierstellen 110 mit dem ersten flachgewebten Element 2 verbunden, insbesondere vernäht sein.

Figur 2b zeigt eine weitere Ausführung einer zweilagigen Laminatstruktur 1, die zwei flachgewebte Elemente 2, 2a umfasst. Sie unterscheidet sich von der in Figur 2a dargestellten Struktur dadurch, dass eine Nahtschlaufe 41 durch MD-Fäden 10 des ersten flachgewebten Elements 2 gebildet wird, während die zweite Nahtschlaufe 42 durch MD-Fäden 10 des zweiten flachgewebten Elements 2a gebildet wird. Die beiden flachgewebten Elemente 2, 2a können dabei gleich, insbesondere auch gleich lang sein. Alternativ kann aber auch vorgesehen sein, dass sie sich in einem oder mehreren Merkmalen, insbesondere in der Länge, unterscheiden.

Die Figur 2c zeigt eine weitere Ausführung einer zweilagigen Laminatstruktur 1, welche drei flachgewebte Elemente 2, 2a, 2b umfasst.

Figur 3 zeigt eine Ausführung einer Bespannung nach einem Aspekt der Erfindung. Auf der zweilagige Laminatstruktur 1 aus Figur 1c sind dabei Vlieslagen 5a, 5b, 5c, 5d angebracht. Diese sind üblicherweise durch Vernadeln befestigt. Durch die Vernadelung erfolgt im Übrigen noch eine weitere Verbindung der beiden Lagen der zweilagigen Laminatstruktur 1 miteinander.

Figur 4 zeigt eine Nahtschlaufe 42, gebildet aus einem MD-Faden 10. Der MD-Faden 10 ist hier als rundes Monofilament ausgeführt. Auf der oberen Seite der Bespannung ist eine Vlieslage 15 vorgesehen. Zur Bestimmung des LD/MDYD Verhältnisses ist in die Nahtschlaufe 42 ein Kreis einbeschrieben. Dies ist der größte Kreis, welcher sich

vollständig in die Nahtschlaufe 42 einfügen lässt. Die Bestimmung derartiger Kreise und deren Durchmesser ist eine geläufige geometrische Übung. Bei handelsüblichen Mikroskopen ist eine derartige Messung auch im Funktionsumfang der Bedienungssoftware enthalten. Bei den Bespannungen gemäß dieser Erfindung stehen die Nahtschlaufen auch senkrecht oder weitgehend senkrecht, so dass die Problematik einer möglichen Verzerrung nicht auftritt.
Der Durchmesser des Kreises beträgt im Falle der Figur 4 1200 µm. Der Durchmesser des MD Fadens liegt bei 340 µm. Das daraus resultierende LD/MDYD Verhältnis ist daher 1200/340=3.5. Eine Bespannung mit derartigen Nahtschlaufen erfüllt somit das Merkmal des kennzeichnenden Teils des Anspruchs 1.

In Figur 5 ist beispielhaft ein Ausschnitt aus einer Fügestelle 200 dargestellt, welche mittels Lasertransmissionsschweißen hergestellt ist. Die transparenten Fügepartner 100, 105 sind hier mittels eines Verbindungselements 120 miteinander verbunden. Das Verbindungselement 120 ist in Figur 5 exemplarisch als schwarzer Faden 120 realisiert. Bei den transparenten Fügepartnern100, 105 kann es sich beispielsweise um MD-Fäden 10 längsseitiger Enden 21, 22 einer bzw. zweier flachgewebter Elemente 2, 2a, 2b handeln. Man erkennt, dass das Verbindungselement 120 zwar durch den Schweißvorgang merklich deformiert wurde. Die transparenten Fügepartner 100, 105 sind jedoch strukturell weitgehend unbeschädigt. Aufgrund dieser Eigenschaft lassen sich mittels Lasertransmissionsschweißen hergestellte Verbindungen auch von anderen Schweißverbindungen unterscheiden.

Patentansprüche

1. Bespannung, insbesondere Nahtfilz für eine Maschine zur Herstellung einer Faserstoffbahn, insbesondere einer Papier~, Karton~, Tissue~ oder Zellstoffbahn, umfassend eine Grundstruktur, die eine zweilagige Laminatstruktur (1) aus einem oder mehreren flachgewebten Elementen (2, 2a, 2b) umfasst oder daraus besteht, wobei die Laminatstruktur (1) MD-Fäden (10) aufweist, welche an den beiden stirnseitigen Enden der Grundstruktur Nahtschlaufen (41, 42) ausbilden und die beiden Lagen der Laminatstruktur (1) über die Nahtschlaufen (41, 42) miteinander verbunden sind, und wobei die Bespannung durch Verbinden ihrer stirnseitigen Enden mittels einer Naht endlos gemacht ist, und diese Naht durch Ineinandergreifen der Nahtschlaufen (41, 42) beider stirnseitiger Enden und das Einführen eines Steckelements ausgeführt ist, **dadurch gekennzeichnet, dass** der Durchmesser (LD) der Nahtschlaufen (41, 42) und der Durchmesser (MDYD) der zugehörigen MD-Fäden (10) ein Verhältnis LD/MDYD zwischen 2.5 und 4, insbesondere zwischen 2.7 und 3.6 aufweisen.

2. Bespannung gemäß Anspruch 1, dadurch gekennzeichnet, dass zumindest eines insbesondere alle flachgewebten Elemente (2, 2a, 2b) Flottierungen aufweisen, die sich über zwei oder mehrere Fäden erstrecken.

3. Bespannung gemäß einem der vorherigen Ansprüche, **dadurch gekennzeichnet, dass** jedes der flachgewebten Elemente (2. 2a, 2b) ein erstes und ein zweites längsseitiges Ende (21, 22, 21a, 22a) aufweist, und die zweilagige Laminatstruktur (1) zumindest eine Fügestelle (200) aufweist, an der zwei längsseitige Enden (21, 22, 21a, 22a) miteinander verbunden sind, wobei diese längsseitigen Enden (21, 22, 21a, 22a) zu demselben flachgewebten Element (2, 2a, 2b) oder zu verschiedenen flachgewebten Elementen (2, 2a, 2b) gehören können.

4. Bespannung nach Anspruch 3, **dadurch gekennzeichnet, dass** die Verbindung der zwei längsseitige Enden (21, 22, 21a, 22a) durch eine Schweißverbindung,

insbesondere eine mittels Lasertransmissionsschweißen erzeugte Schweißverbindung realisiert ist.

5. Bespannung nach einem der Ansprüche 3 oder 4, **dadurch gekennzeichnet, dass** die Ausdehnung der zumindest einen Fügestelle (200) in Maschinenrichtung (MD) weniger als 15mm, insbesondere weniger als 5mm beträgt.

6. Bespannung nach einem der Ansprüche 3 bis 5, **dadurch gekennzeichnet, dass** die zumindest eine Fügestelle (200) durch Verbindungselemente (120), insbesondere Verbindungsfäden (120) realisiert ist, welche mit zumindest einem, vorzugsweise beiden längsseitigen Enden (21, 22, 21a, 22a) verschweißt sind.

7. Bespannung nach Anspruch 6, **dadurch gekennzeichnet, dass** als Verbindungselemente (120) Verbindungsfäden (120) verwendet sind, welche in CD-Richtung der Bespannung angeordnet sind, wobei für eine Fügestelle (200) maximal drei Verbindungsfäden (120), insbesondere maximal zwei Verbindungsfäden (120) vorgesehen sind.

8. Bespannung nach Anspruch 7, **dadurch gekennzeichnet, dass** eine oder mehrere der Verbindungsfäden (120) mit MD-Fäden (10) zumindest eines längsseitigen Endes (21, 22, 21a, 22a) verwoben sind.

9. Bespannung nach einem der vorherigen Ansprüche, **dadurch gekennzeichnet, dass** die MD-Fäden (10) als Monofilamente, insbesondere als Monofilamente mit rundem Querschnitt ausgeführt sind.

10. Bespannung nach einem der vorherigen Ansprüche**, dadurch gekennzeichnet, dass** der Durchmesser der MD-Fäden (10) zwischen 0.15mm und 0.7mm, insbesondere zwischen 0.3mm und 0.5mm beträgt.

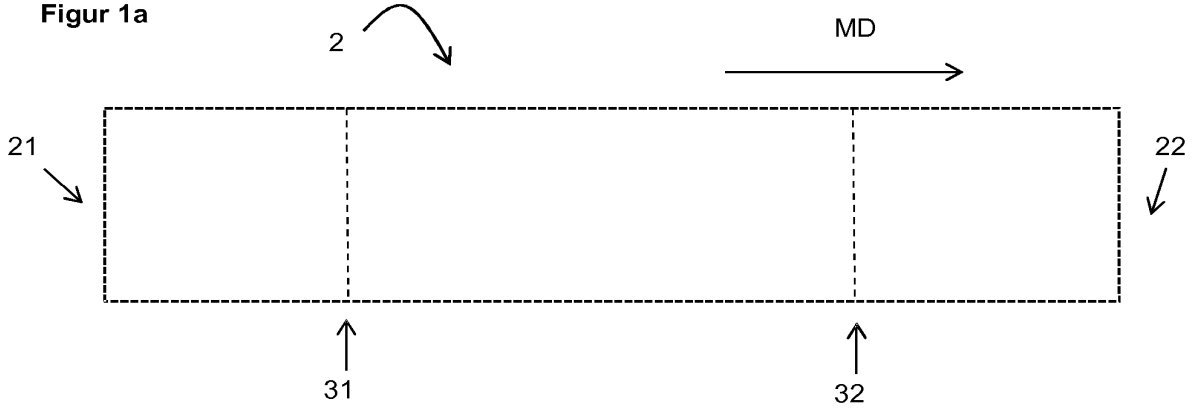
11. Bespannung nach einem der vorigen Ansprüche, **dadurch gekennzeichnet, dass** die Schlaufendichte der Naht zwischen 64% und 90%, insbesondere zwischen 72% und 86% beträgt.

12. Bespannung nach einem der vorherigen Ansprüche**, dadurch gekennzeichnet, dass** die Bespannung zumindest an ihrer Papier berührenden Oberseite eine oder mehrere Lagen (5a, 5b, 5c, 5d) aus Vliesfasern aufweist.

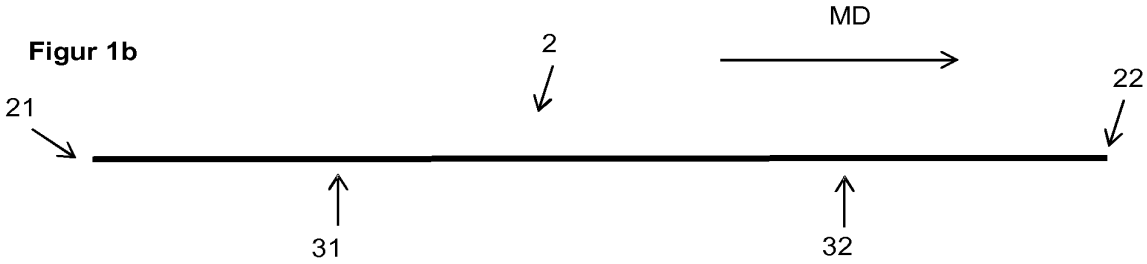
13. Bespannung nach Anspruch 12, **dadurch gekennzeichnet, dass** zumindest einige der Vliesfasern ein Elastomer, insbesondere ein Polyurethan umfassen oder daraus bestehen.

14. Bespannung nach einem der vorherigen Ansprüche, **dadurch gekennzeichnet, dass** im Bereich der Naht zumindest ein streifenförmiges, strömungsbehinderndes Element vorgesehen ist, welches so eingerichtet ist, dass die Durchlässigkeit für Luft und/oder Wasser im Bereich der Naht im Wesentlichen dieselbe ist, wie in der übrigen Bespannung.

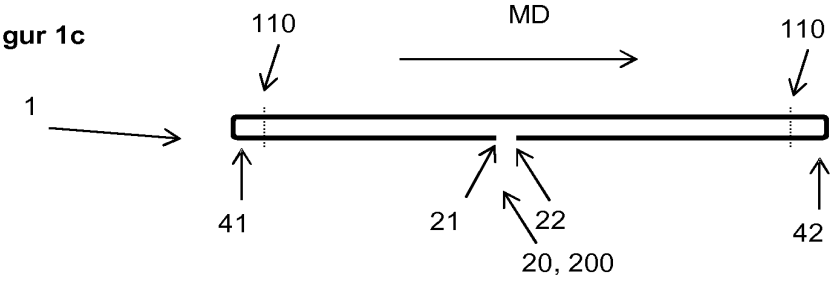
Figur 1a



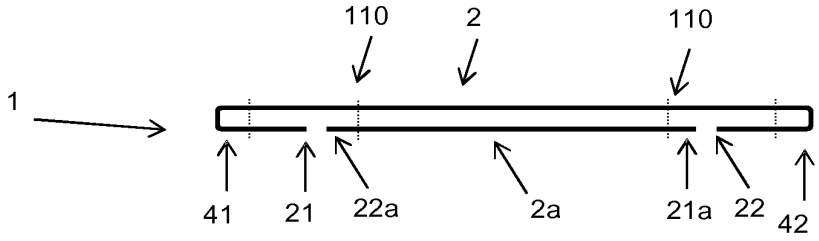
Figur 1b



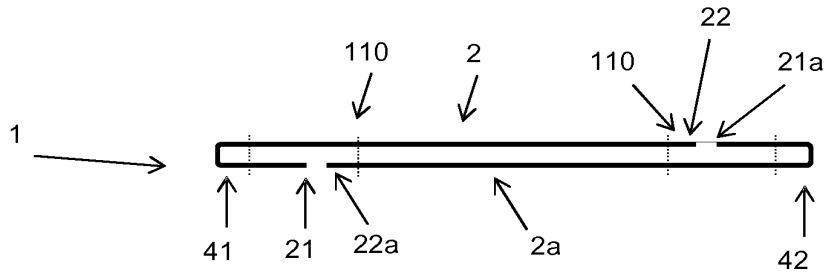
Figur 1c



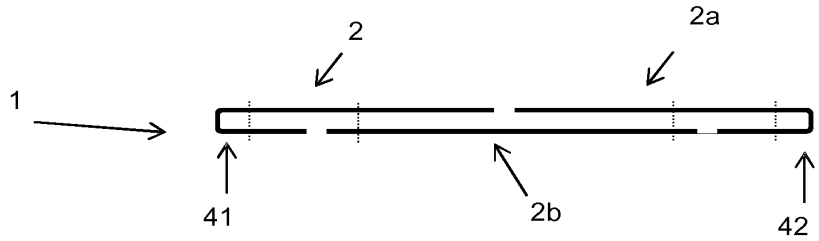
Figur 2a



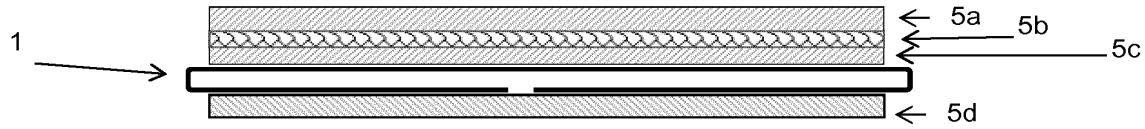
Figur 2b



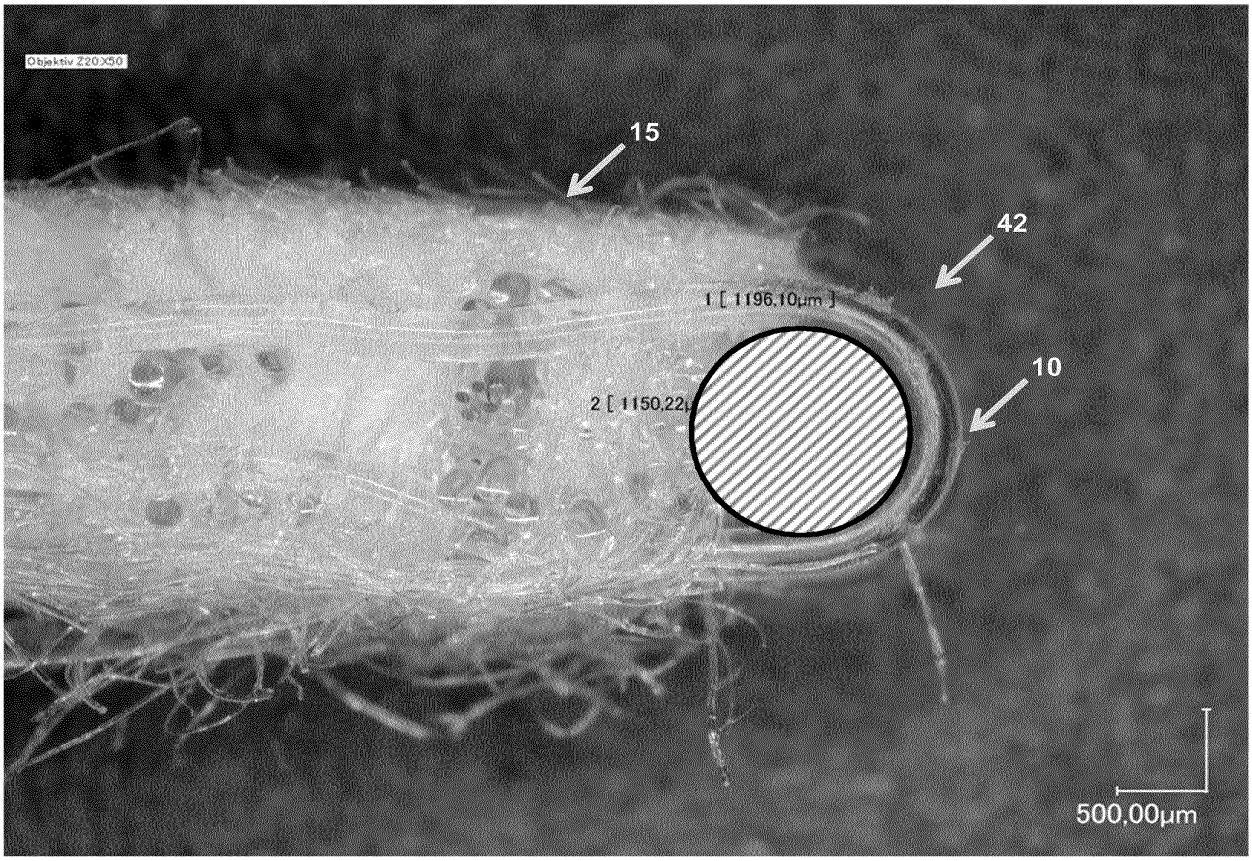
Figur 2c



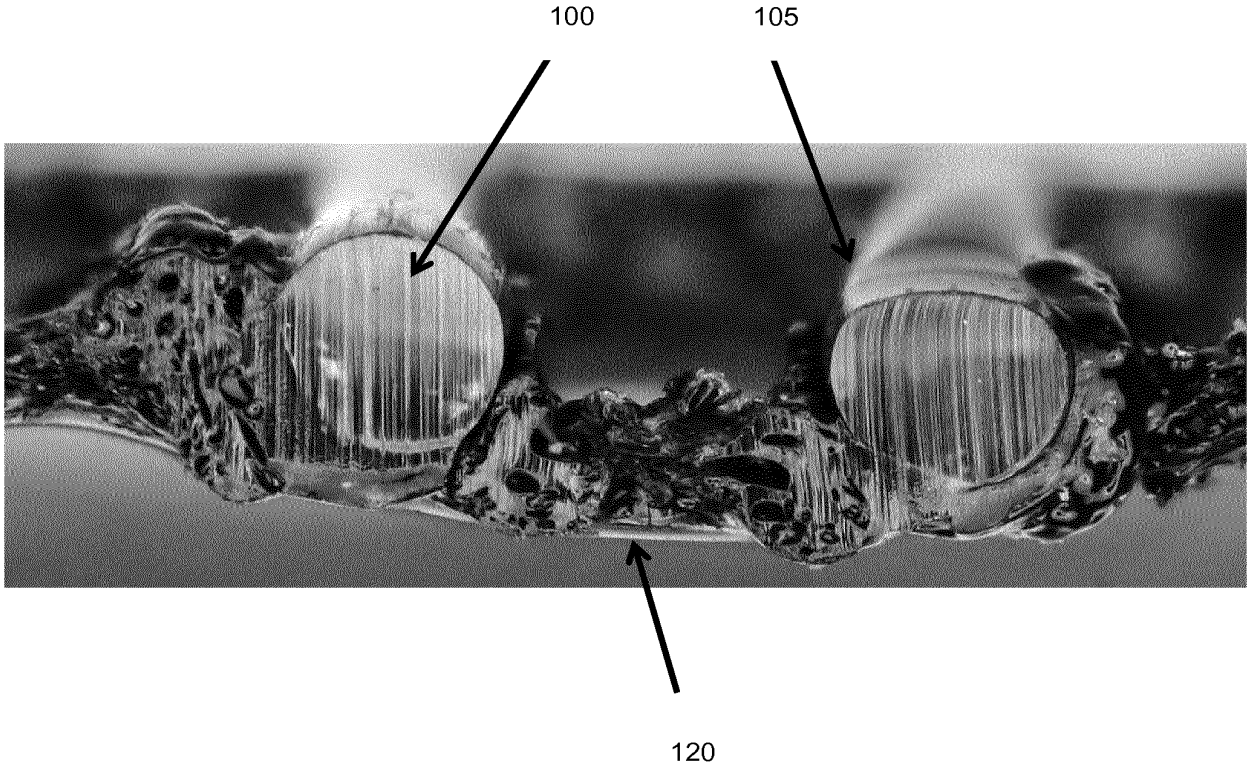
Figur 3



Figur 4



Figur 5



INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2019/055955

A. CLASSIFICATION OF SUBJECT MATTER

D21F 1/00(2006.01)i; ***D21F 7/08***(2006.01)i; ***D21F 7/10***(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)

D21F

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

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

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0425523 A1 (SCAPA GROUP PLC [GB]) 08 May 1991 (1991-05-08) cited in the application column 2, line 24 - column 4, line 6; figures	1
A	US 2017044718 A1 (WICH TORSTEN [US]) 16 February 2017 (2017-02-16) paragraphs [0030] - [0036]; figures	1
A	US 2009090425 A1 (HAWES JOHN M [US] ET AL) 09 April 2009 (2009-04-09) paragraphs [0044] - [0053]; figures	1

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

* Special categories of cited documents:

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"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	Date of mailing of the international search report
03 April 2019	**15 April 2019**

Name and mailing address of the ISA/EP	Authorized officer
European Patent Office **p.b. 5818, Patentlaan 2, 2280 HV Rijswijk** **Netherlands** Telephone No. **(+31-70)340-2040** Facsimile No. **(+31-70)340-3016**	**Maisonnier, Claire** Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/EP2019/055955

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
EP	0425523	A1	08 May 1991	AT	119955	T	15 April 1995
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				WO	8912717	A1	28 December 1989
US	2017044718	A1	16 February 2017	NONE			
US	2009090425	A1	09 April 2009	BR	PI0817343	A2	04 October 2016
				CA	2701224	A1	09 April 2009
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				EP	2198083	A1	23 June 2010
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				US	2009090425	A1	09 April 2009
				WO	2009046017	A1	09 April 2009

INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen
PCT/EP2019/055955

A. KLASSIFIZIERUNG DES ANMELDUNGSGEGENSTANDES
INV. D21F1/00 D21F7/08 D21F7/10
ADD.

Nach der Internationalen Patentklassifikation (IPC) oder nach der nationalen Klassifikation und der IPC

B. RECHERCHIERTE GEBIETE

Recherchierter Mindestprüfstoff (Klassifikationssystem und Klassifikationssymbole)
D21F

Recherchierte, aber nicht zum Mindestprüfstoff gehörende Veröffentlichungen, soweit diese unter die recherchierten Gebiete fallen

Während der internationalen Recherche konsultierte elektronische Datenbank (Name der Datenbank und evtl. verwendete Suchbegriffe)
EPO-Internal

C. ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
A	EP 0 425 523 A1 (SCAPA GROUP PLC [GB]) 8. Mai 1991 (1991-05-08) in der Anmeldung erwähnt Spalte 2, Zeile 24 - Spalte 4, Zeile 6; Abbildungen	1
A	US 2017/044718 A1 (WICH TORSTEN [US]) 16. Februar 2017 (2017-02-16) Absätze [0030] - [0036]; Abbildungen	1
A	US 2009/090425 A1 (HAWES JOHN M [US] ET AL) 9. April 2009 (2009-04-09) Absätze [0044] - [0053]; Abbildungen	1

☐ Weitere Veröffentlichungen sind der Fortsetzung von Feld C zu entnehmen ☒ Siehe Anhang Patentfamilie

* Besondere Kategorien von angegebenen Veröffentlichungen :
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"&" Veröffentlichung, die Mitglied derselben Patentfamilie ist

Datum des Abschlusses der internationalen Recherche	Absendedatum des internationalen Recherchenberichts
3. April 2019	15/04/2019

Name und Postanschrift der Internationalen Recherchenbehörde	Bevollmächtigter Bediensteter
Europäisches Patentamt, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Maisonnier, Claire

2

Formblatt PCT/ISA/210 (Blatt 2) (April 2005)

INTERNATIONALER RECHERCHENBERICHT

Angaben zu Veröffentlichungen, die zur selben Patentfamilie gehören

Internationales Aktenzeichen
PCT/EP2019/055955

Im Recherchenbericht angeführtes Patentdokument	Datum der Veröffentlichung	Mitglied(er) der Patentfamilie	Datum der Veröffentlichung
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		DE 68921754 D1	20-04-1995
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US 2009090425 A1	09-04-2009	BR PI0817343 A2	04-10-2016
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		RU 2010112547 A	10-11-2011
		TW 200936845 A	01-09-2009
		US 2009090425 A1	09-04-2009
		WO 2009046017 A1	09-04-2009

Docket No.: VP-22858

CHARGE AUTHORIZATION

Should any extension of time be required for any reason during the pendency of this application, petition for extension is herewith made.

The Patent Office is hereby authorized to charge any extension fees, or any other fees due under 37 CFR §§ 1.16 and 1.17 or deficiencies in required fees to deposit account 12-1099 of Lerner Greenberg Stemer LLP during the pendency of this application.

/Laurence A. Greenberg/
Laurence A. Greenberg
Reg. No. 29,308

Docket No.: VP-22858

DECLARATION

As the below named inventor, I hereby declare that:

* this declaration is directed to the attached application entitled

  COVERING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB

* which claims the benefit of German patent application DE 10 2018 105 956, filed March 15, 2018, and international application PCT/EP2019/055955, filed March 11, 2019;

* I believe that I am the original inventor or an original joint inventor of a claimed invention in this application;

* the application was made or authorized to be made by me.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. § 1001 by fine or imprisonment of not more than five (5) years, or both.

LEGAL NAME OF INVENTOR: **ROBERT EBERHARDT**

Signature

30.7.2020
Date

LEGAL NAME OF INVENTOR: **SUSANNE KLASCHKA**

Signature

Date

Docket No.: VP-22858

DECLARATION

As the below named inventor, I hereby declare that:

- this declaration is directed to the attached application entitled

  COVERING FOR A MACHINE FOR PRODUCING A FIBROUS MATERIAL WEB

- which claims the benefit of German patent application DE 10 2018 105 956, filed March 15, 2018, and international application PCT/EP2019/055955, filed March 11, 2019;
- I believe that I am the original inventor or an original joint inventor of a claimed invention in this application;
- the application was made or authorized to be made by me.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. § 1001 by fine or imprisonment of not more than five (5) years, or both.

LEGAL NAME OF INVENTOR: **ROBERT EBERHARDT**

Signature _____ Date _____

LEGAL NAME OF INVENTOR: **SUSANNE KLASCHKA**

S. Klaschka

Signature

2020-08-10

Date