

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Central District of California on the following

☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.);

DOCKET NO.	DATE FILED 8/26/2022	U.S. DISTRICT COURT Central District of California
PLAINTIFF MR TECHNOLOGIES, GMBH		DEFENDANT WESTERN DIGITAL TECHNOLOGIES, INC.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 9,978,413	5/22/2018	MR TECHNOLOGIES, GMBH
2 11,133,031	9/8/2021	MR TECHNOLOGIES, GMBH
3 9,928,864	3/27/2018	MR TECHNOLOGIES, GMBH
4 11,138,997	10/5/2021	MR TECHNOLOGIES, GMBH
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT		
CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been
filed in the U.S. District Court Western District of Texas on the following

☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.);

DOCKET NO. 6:22-cv-00612	DATE FILED 6/13/2022	U.S. DISTRICT COURT Western District of Texas
PLAINTIFF MR TECHNOLOGIES, GMBH		DEFENDANT WESTERN DIGITAL CORPORATION
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 9,978,413	5/22/2018	MR TECHNOLOGIES, GMBH
2 11,133,031	9/28/2021	MR TECHNOLOGIES, GMBH
3 9,928,864	3/27/2018	MR TECHNOLOGIES, GMBH
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1		
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4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT <p style="text-align: center;">08/26/2022 Doc #9 NOTICE of Voluntary Dismissal</p>

CLERK PHILIP J. DEVLIN	(BY) DEPUTY CLERK 	DATE 08/26/2022
----------------------------------	---	---------------------------

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Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

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AO 120 (Rev. 08/10)

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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.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/925,749	10/05/2021	11138997	SUSP02US2	8424

143793 7590 09/15/2021
Gergely T. Zimanyi
11 Dartmouth Drive
Berkeley, CA 94705

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.

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

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.

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)

143793 7590 05/27/2021
Gergely T. Zimanyi
11 Dartmouth Drive
Berkeley, CA 94705

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.
15/925,749	03/19/2018	Dieter Suess	SUSP02US2	8424

TITLE OF INVENTION: MULTILAYER EXCHANGE SPRING RECORDING MEDIA

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$600	\$0.00	\$0.00	\$600	08/27/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
CHAU, LISA N	1785	428-827000

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, 1 _____

(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. 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 _____

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. _____

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 /Gergely T. Zimanyi/

Date 08/27/2021

Typed or printed name Gergely T. Zimanyi

Registration No. 45,754

Electronic Patent Application Fee Transmittal				
Application Number:		15925749		
Filing Date:		19-Mar-2018		
Title of Invention:		MULTILAYER EXCHANGE SPRING RECORDING MEDIA		
First Named Inventor/Applicant Name:		Dieter Suess		
Filer:		Gergely T. Zimanyi/Richard Pask		
Attorney Docket Number:		SUSP02US2		
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
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	2501	1	600	600

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				600

Electronic Acknowledgement Receipt	
EFS ID:	43629664
Application Number:	15925749
International Application Number:	
Confirmation Number:	8424
Title of Invention:	MULTILAYER EXCHANGE SPRING RECORDING MEDIA
First Named Inventor/Applicant Name:	Dieter Suess
Customer Number:	143793
Filer:	Gergely T. Zimanyi/Richard Pask
Filer Authorized By:	Gergely T. Zimanyi
Attorney Docket Number:	SUSP02US2
Receipt Date:	28-AUG-2021
Filing Date:	19-MAR-2018
Time Stamp:	00:01:23
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 600
RAM confirmation Number	E20218R103000012
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)	1_SUSP02US2_Issue_Fee.pdf	375238	no	1
			1a0a30e546d5901a43a77c398f3f8a5aeeb700c0		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	37930	no	2
			9d7835454ca8a381d1f2e2c76ccb78d77a7a666		
Warnings:					
Information:					
Total Files Size (in bytes):			413168		
<p>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.</p> <p><u>New Applications Under 35 U.S.C. 111</u> 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.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> 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.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> 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.</p>					

UNITED STATES PATENT AND TRADEMARK OFFICE
COMMISSIONER FOR PATENTS
P.O.BOX 1450
ALEXANDRIA VA 22313-1451

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POSTEDIGITAL
NNNNN

Gergely T. Zimanyi
11 Dartmouth Drive
Berkeley, CA 94705



**Courtesy Reminder for
Application Serial No: 15/925,749**

Attorney Docket No: SUSP02US2

Customer Number: 143793

Date of Electronic Notification: 05/27/2021

This is a courtesy reminder that new correspondence is available for this application. If you have not done so already, please review the correspondence. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

An email notification regarding the correspondence was sent to the following email address(es) associated with your customer number:

gzimanyi@gmail.com

richepask@gmail.com

To view your correspondence online or update your email addresses, please visit us anytime at **<https://ppair-my.uspto.gov/pair/PrivatePair>**.

If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov or call 1-866-217-9197.



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

NOTICE OF ALLOWANCE AND FEE(S) DUE

143793 7590
Gergely T. Zimanyi
11 Dartmouth Drive
Berkeley, CA 94705

05/27/2021

EXAMINER

CHAU, LISA N

ART UNIT

PAPER NUMBER

1785

DATE MAILED: 05/27/2021

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/925,749	03/19/2018	Dieter Suess	SUSP02US2	8424

TITLE OF INVENTION: MULTILAYER EXCHANGE SPRING RECORDING MEDIA

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$600	\$0.00	\$0.00	\$600	08/27/2021

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)

143793 7590 05/27/2021
Gergely T. Zimany
11 Dartmouth Drive
Berkeley, CA 94705

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.
15/925,749	03/19/2018	Dieter Suess	SUSP02US2	8424

TITLE OF INVENTION: MULTILAYER EXCHANGE SPRING RECORDING MEDIA

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$600	\$0.00	\$0.00	\$600	08/27/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
CHAU, LISA N	1785	428-827000

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, 1 _____

(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. 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 _____

4b. Method of Payment: (Please first reapply 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. _____

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.

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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 _____

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.
15/925,749	03/19/2018	Dieter Suess	SUSP02US2	8424
143793	7590	05/27/2021	EXAMINER	
Gergely T. Zimanyi 11 Dartmouth Drive Berkeley, CA 94705			CHAU, LISA N	
			ART UNIT	PAPER NUMBER
			1785	
DATE MAILED: 05/27/2021				

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. 15/925,749	Applicant(s) Suess, Dieter	
	Examiner LISA CHAU	Art Unit 1785	AIA (FITF) Status No

-- 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 2/5/2021.
☐ 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 1-2,4-8 and 11-12. 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)	5. ☒ Examiner's Amendment/Comment
2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date <u>2/5/2021</u> .	6. ☒ Examiner's Statement of Reasons for Allowance
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.	7. ☐ Other _____.
4. ☒ Interview Summary (PTO-413), Paper No./Mail Date. <u>5/17/2021</u> .	

/LC/ Lisa Chau	/Holly Rickman/ Primary Examiner, Art Unit 1785
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EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in an interview with Gergely Zimanyi on 5/18/2021.

The application has been amended as follows:

Claims 13-24 (cancelled).

Reasons for Allowance

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

The closest prior art, D. Suess et al., "Optimization of Exchange Spring Perpendicular Recording Media" Intermag Nagoya, April 2005, magnet.aip.tuwien.ac.at, Vienna University of Technology, Austria 18 powerpoint printout pages ("Suess et al."), teaches a magnetic recording medium comprising an exchange coupled magnetic multilayer structure comprising a hard magnetic storage layer having a first coercive field greater than 0.5 T and a nucleation host having a second coercive field, wherein said nucleation host is formed on the hard magnetic storage layer, exchange coupled to the hard magnetic storage layer, and has a gradient anisotropy (i.e. magnetic moments/vectors in a gradient anisotropy) (Please see Slides 1, 3, and 15).

However, the prior art of record does not teach or suggest the coercive field relationship between the nucleation host and hard magnetic storage layer and a nucleation host comprising multiple ferromagnetic layers with increasing anisotropy constant K from layer to layer.

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."

Conclusion

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LISA CHAU whose telephone number is (571)270-5496. The examiner can normally be reached on Monday-Friday 11 AM-730 PM.

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, Mark Ruthkosky can be reached on (571) 272-1291. 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.

/LC/
Lisa Chau
Art Unit 1785

/Holly Rickman/
Primary Examiner, Art Unit 1785

<i>Examiner-Initiated Interview Summary</i>	Application No. 15/925,749	Applicant(s) Suess, Dieter		
	Examiner LISA CHAU	Art Unit 1785	AIA (First Inventor to File) Status No	Page 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	Title	Type
LISA CHAU	Examiner	Telephonic
Gergely Zimanyi	Agent	

Date of Interview: 17 May 2021

Issues Discussed:

Other

Authorization for Examiner's Amendment

/LISA N CHAU/ Examiner, Art Unit 1785	/Holly Rickman/ Primary Examiner, Art Unit 1785
<p>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</p> <p>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</p>	

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.

Issue Classification 	Application/Control No. 15/925,749	Applicant(s)/Patent Under Reexamination Suess, Dieter
	Examiner LISA CHAU	Art Unit 1785

CPC						
Symbol					Type	Version
G11B	/	5	/	66	F	2013-01-01
B82Y	/	25	/	00	I	2013-01-01
G01R	/	33	/	093	I	2013-01-01
G01R	/	33	/	1207	I	2013-01-01
G11B	/	5	/	64	I	2013-01-01

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

/LC/ Lisa Chau (Assistant Examiner)	18 May 2021 (Date)	Total Claims Allowed: 9	
/Holly Rickman/ Primary Examiner, Art Unit 1785 (Priamry Examiner)	21 May 2021 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 1

U.S. Patent and Trademark Office

Part of Paper No.: 20210518

Issue Classification 	Application/Control No. 15/925,749	Applicant(s)/Patent Under Reexamination Suess, Dieter
	Examiner LISA CHAU	Art Unit 1785

INTERNATIONAL CLASSIFICATION			
CLAIMED			
G11B	/	5	/ 66

NON-CLAIMED			
/	/	/	/

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS

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

/LC/ Lisa Chau (Assistant Examiner)	18 May 2021 (Date)	Total Claims Allowed: 9	
/Holly Rickman/ Primary Examiner, Art Unit 1785 (Primary Examiner)	21 May 2021 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 1

U.S. Patent and Trademark Office

Part of Paper No.: 20210518

Issue Classification 	Application/Control No. 15/925,749	Applicant(s)/Patent Under Reexamination Sues, Dieter
	Examiner LISA CHAU	Art Unit 1785

☐ 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	1		10		19										
2	2	8	11		20										
	3	9	12		21										
3	4		13		22										
4	5		14		23										
5	6		15		24										
6	7		16												
7	8		17												
	9		18												

/LC/ Lisa Chau (Assistant Examiner)	18 May 2021 (Date)	Total Claims Allowed: 9	
/Holly Rickman/ Primary Examiner, Art Unit 1785 (Primary Examiner)	21 May 2021 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 1

U.S. Patent and Trademark Office

Part of Paper No.: 20210518

<i>Search Notes</i> 	Application/Control No. 15/925,749	Applicant(s)/Patent Under Reexamination Suess, Dieter
	Examiner LISA CHAU	Art Unit 1785

CPC - Searched*		
Symbol	Date	Examiner
G11B 5/+	10/25/2019	LC
G11B 2005/0029, 3996	10/25/2019	LC
G11B 20/10, 1217	10/25/2019	LC
G11B 2020/10898, 1281	10/25/2019	LC
G11B 2220/235, 2516	10/25/2019	LC
H01F 10/3295, 30, 12, 3218, 324	10/25/2019	LC
H01F 41/0206, 18, 30, 302, 303, 305, 32	10/25/2019	LC

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner
428	800+		

* 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
Inventor	10/25/2019	LC
Prosecution histories on App. No. 11424859 and 12619849	10/25/2019	LC
All classification searched with TEXT	10/25/2019	LC
Update	09/01/2020, 5/18/2021	LC

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<i>Search Notes</i> 	Application/Control No. 15/925,749	Applicant(s)/Patent Under Reexamination Suess, Dieter
	Examiner LISA CHAU	Art Unit 1785

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
EAST	USPat and USPGPub	05/18/2021	LC

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	2	((DIETER) near2 (SUESS)).INV.	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 10:22
S2	1	((DIETER) near2 (SUESS)).INV.	EPO; JPO; DERWENT	ADJ	ON	2011/01/07 10:23
S3	10	((("5583727") or ("6280813") or ("6383668") or ("6468670") or ("20070292720")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2011/01/07 10:24
S4	25	("5569533" "5815342" "6294490").PN. OR ("6383668").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:18
S5	826	(428/827,828,828.1,829).ccls.	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:31
S6	604	S5 and anisotropy	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:31
S7	12	S5 and anisotropy and host	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:32
S8	1	"20100165508"	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:37
S9	46	vary\$6 anisotropy	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:40
S10	2	S9 and "428"/	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:40
S11	4,988	(varies\$5 or vary\$6) same anisotropy	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:52
S12	483	S11 and "428"/	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:52
S13	1,651	(varies\$5 or vary\$6) near12 anisotropy	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:53

S14	1,752	(varies\$5 or vary\$6) near15 anisotropy	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:53
S15	167	S14 and "428"/	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:53
S16	115	S14 and recording.ab.	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:54
S17	4	"20030180577" or "20060228586" or "20060222901"	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/11 14:20
S19	3	"20060177700"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 11:17
S20	3	"20060177704"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 11:19
S21	2	"20050058855"	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/12 16:06
S22	12	"18" and (anti\$1ferro\$1magnet\$5 coupl\$5) and (diameter same grain same height)	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/12 16:07
S23	12	"18" and (anti\$1ferro\$1magnet\$5 coupl\$5) and (diameter same grain same height)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:07
S24	3,445	"18" and (diameter same grain same height)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:08
S25	37	"18" and (diameter same grain same height) and (perpendicular.ab.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:08

S26	828	(428/827,828,828.1,829).ccls.	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/12 16:10
S27	5	S26 and (diameter same grain same height) and (perpendicular.ab.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:10
S28	2	S26 and (anti\$1ferro\$1magnet\$5 coupl\$5) and (diameter same grain same height)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:12
S29	29	S26 and (height same diameter)	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/12 16:13
S30	29	S26 and (height same diameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:13
S31	67	(perpendicular near3 recording).ab. and (height same diameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:30
S32	119	(perpendicular near3 recording).ab. and (thickness same (granular or grain) same diameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:35
S33	15	(perpendicular near3 recording).ab. and (height same (granular or grain) same diameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:38
S34	74	(magnetic recording medium).ab. and (height same (granular or grain) same diameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:38

S35	5	(magnetic recording medium).ab. and (height same (granular or grain) same average diameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:42
S36	116	(magnetic recording medium).ab. and ((granular or grain) same average diameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:43
S37	1,851	(varies\$5 or vary\$6) near15 anisotropy	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/07/12 13:38
S38	859	(428/827,828,828.1,829).ccls.	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/07/12 13:38
S39	20	S37 and S38	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/07/12 13:38
S40	42	428/8\$.ccls. and (grad\$5 near2 anisotrop\$5)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2013/11/01 14:29
S41	3	"20060222901"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2013/11/01 14:32
S42	34	lisa near3 chau	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2013/11/01 17:19
S43	5	"20040057156" or "20040053078"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2013/11/01 17:34
S44	2	"20040013910"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2013/11/01 17:47
S45	8	"6759149"	US-PGPUB; USPAT;	ADJ	OFF	2013/11/01 17:50

			USOCR; EPO; JPO; DERWENT			
S46	3	"20060177704"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2013/11/01 17:50
S47	14	"20040086753" or "20040013910" or "6610424"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2013/11/01 17:57
S48	47	428/8\$.ccls. and (grad\$5 near2 anisotrop\$5)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2014/08/22 14:55
S49	1,117	(428/827,828,828.1,829).ccls.	US-PGPUB; USPAT; USOCR	ADJ	ON	2014/12/28 15:58
S50	1,027	S49 AND (G11B5/66 OR G11B5/65 OR G11B5/7325 OR G11B5/667 OR G11B5/82 OR G11B5/855 OR G11B5/84 OR G11B5/746 OR G11B5/656 OR G11B5/732 OR G11B5/8404 OR G11B5/72 OR G11B5/64 OR G11B5/653 OR G11B5/851 OR G11B5/1278 OR G11B5/738 OR G11B5/743 OR G11B2005/0021 OR G11B2005/0024 OR G11B2005/0029 OR G11B5/3906 OR G11B5/3909 OR G11B2020/1281 OR G11B20/10 OR G11B20/1217 OR G11B2220/235 OR G11B2220/2516 OR G11B5/1276 OR G11B5/235 OR G11B5/3113 OR G11B5/314 OR G11B5/3146 OR G11B5/3153 OR G11B5/3163 OR G11B5/3929 OR G11B5/3983 OR G11B5/6088 OR G11B5/645 OR G11B5/647 OR G11B5/70605 OR G11B5/70626 OR G11B5/708 OR G11B5/716 OR G11B5/7315 OR G11B5/735 OR G11B5/85 OR G11B5/865).CPC.)	US-PGPUB; USPAT; USOCR	ADJ	ON	2014/12/28 15:58
S51	26	S50 and (grad\$5 near2 anisotrop\$5)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2014/12/28 15:58

S52	32	(428/827,828,828.1,829).ccls. and (grad\$5 near2 anisotrop\$5)	US-PGPUB; USPAT; USOCR	ADJ	ON	2015/06/24 17:23
S53	2	Jp "03254421"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2016/02/23 16:46
S54	33	(428/827,828,828.1,829).ccls. and (grad\$5 near2 anisotrop\$5)	US-PGPUB; USPAT; USOCR	ADJ	ON	2016/02/23 18:20
S55	56	chau near3 lisa	US-PGPUB; USPAT; USOCR	ADJ	ON	2016/08/29 16:26
S56	4	"20010051287"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2016/08/29 19:25
S57	8	"20050058855"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2016/08/29 19:39
S58	1,161	(428/827,828,828.1,829).ccls.	US-PGPUB; USPAT; USOCR	ADJ	ON	2017/06/11 17:15
S59	1,070	S58 AND (G11B5/66 OR G11B5/65 OR G11B5/7325 OR G11B5/667 OR G11B5/82 OR G11B5/855 OR G11B5/84 OR G11B5/746 OR G11B5/656 OR G11B5/732 OR G11B5/8404 OR G11B5/72 OR G11B5/64 OR G11B5/653 OR G11B5/851 OR G11B5/1278 OR G11B5/738 OR G11B5/743 OR G11B2005/0021 OR G11B2005/0024 OR G11B2005/0029 OR G11B5/3906 OR G11B5/3909 OR G11B2020/1281 OR G11B20/10 OR G11B20/1217 OR G11B2220/235 OR G11B2220/2516 OR G11B5/1276 OR G11B5/235 OR G11B5/3113 OR G11B5/314 OR G11B5/3146 OR G11B5/3153 OR G11B5/3163 OR G11B5/3929 OR G11B5/3983 OR G11B5/6088 OR G11B5/645 OR G11B5/647 OR G11B5/70605 OR G11B5/70626 OR G11B5/708 OR	US-PGPUB; USPAT; USOCR	ADJ	ON	2017/06/11 17:15

		G11B5/716 OR G11B5/7315 OR G11B5/735 OR G11B5/85 OR G11B5/865).CPC.)				
S60	34	S59 and (grad\$5 near2 anisotrop\$5)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2017/06/11 17:15
S68	23	((("20010051287") or ("20040053078") or ("20040057156") or ("20070292720") or ("5583727") or ("6280813") or ("6383668") or ("6468670") or ("7550210"))).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2017/12/04 12:42
S69	80	lisa near2 chau	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2019/10/09 11:39
S70	1	"20180211689"	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:00
S71	2,303	((G11B5/64 OR G11B5/66).CPC.)	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:01
S72	1,161	(428/827,828,828.1,829).ccls.	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:01
S73	1,110	S72 AND ((G11B5/66 OR G11B5/65 OR G11B5/7325 OR G11B5/667 OR G11B5/82 OR G11B5/656 OR G11B5/84 OR G11B5/855 OR G11B5/7379 OR G11B5/746 OR G11B5/851 OR G11B2005/0021 OR G11B2005/0024 OR G11B5/64 OR G11B5/653 OR G11B5/73 OR G11B5/1278 OR G11B5/8404 OR G11B5/314 OR G11B5/743 OR G11B5/3909 OR G11B5/72 OR G11B5/7315 OR G11B2005/0029 OR G11B2005/3996 OR G11B20/10 OR G11B5/1276 OR G11B5/85 OR G11B2020/10898 OR G11B2020/1281 OR G11B20/1217 OR G11B2220/235 OR G11B2220/2516 OR G11B5/127 OR G11B5/1272 OR G11B5/235 OR G11B5/3113 OR G11B5/3133 OR G11B5/3146 OR G11B5/3153 OR G11B5/3163 OR G11B5/3906 OR G11B5/3912 OR G11B5/3929 OR	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:01

		G11B5/6088 OR G11B5/645 OR G11B5/647 OR G11B5/706 OR G11B5/70605 OR G11B5/708 OR G11B5/716 OR G11B5/735 OR G11B5/865 OR H01F10/3286 OR H01F10/123 OR H01F10/3254 OR H01F10/3272 OR H01F10/329 OR H01F10/3295 OR H01F10/30 OR H01F41/0206 OR H01F10/12 OR H01F10/3218 OR H01F10/324 OR H01F41/18 OR H01F41/30 OR H01F41/302 OR H01F41/303 OR H01F41/305 OR H01F41/32 OR Y10T428/115 OR Y10T29/4902 OR Y10T29/49032 OR Y10T29/49067 OR Y10T428/12458 OR Y10T428/12465 OR Y10T428/12931 OR Y10T428/26 OR Y10T428/265 OR Y10T156/10 OR Y10T29/49021 OR Y10T29/49043 OR Y10T29/49044 OR Y10T29/49048 OR Y10T29/49052 OR Y10T428/11 OR Y10T428/1107 OR Y10T428/1114 OR Y10T428/1121 OR Y10T428/1143 OR Y10T428/24273 OR Y10T428/315 OR Y10T83/04).CPC.)				
S74	96,979	(G11B5/66 OR G11B5/65 OR G11B5/7325 OR G11B5/667 OR G11B5/82 OR G11B5/656 OR G11B5/84 OR G11B5/855 OR G11B5/7379 OR G11B5/746 OR G11B5/851 OR G11B2005/0021 OR G11B2005/0024 OR G11B5/64 OR G11B5/653 OR G11B5/73 OR G11B5/1278 OR G11B5/8404 OR G11B5/314 OR G11B5/743 OR G11B5/3909 OR G11B5/72 OR G11B5/7315 OR G11B2005/0029 OR G11B2005/3996 OR G11B20/10 OR G11B5/1276 OR G11B5/85 OR G11B2020/10898 OR G11B2020/1281 OR G11B20/1217 OR G11B2220/235 OR G11B2220/2516 OR G11B5/127 OR G11B5/1272 OR G11B5/235 OR G11B5/3113 OR G11B5/3133 OR G11B5/3146 OR G11B5/3153 OR G11B5/3163 OR G11B5/3906 OR G11B5/3912 OR G11B5/3929 OR G11B5/6088 OR G11B5/645 OR G11B5/647 OR G11B5/706 OR G11B5/70605 OR G11B5/708 OR G11B5/716 OR G11B5/735 OR G11B5/865 OR H01F10/3286 OR H01F10/123 OR H01F10/3254 OR H01F10/3272 OR H01F10/329 OR H01F10/3295 OR	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:01

		H01F10/30 OR H01F41/0206 OR H01F10/12 OR H01F10/3218 OR H01F10/324 OR H01F41/18 OR H01F41/30 OR H01F41/302 OR H01F41/303 OR H01F41/305 OR H01F41/32 OR Y10T428/115 OR Y10T29/4902 OR Y10T29/49032 OR Y10T29/49067 OR Y10T428/12458 OR Y10T428/12465 OR Y10T428/12931 OR Y10T428/26 OR Y10T428/265 OR Y10T156/10 OR Y10T29/49021 OR Y10T29/49043 OR Y10T29/49044 OR Y10T29/49048 OR Y10T29/49052 OR Y10T428/11 OR Y10T428/1107 OR Y10T428/1114 OR Y10T428/1121 OR Y10T428/1143 OR Y10T428/24273 OR Y10T428/315 OR Y10T83/04).CPC.)				
S75	9	S73 and ((varies\$5 or vary\$6 or gradient\$5 or gradual\$5 or variat\$5) near15 (anisotrop\$5 near3 ("k" or constant\$5)))	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:02
S76	57	S74 and ((varies\$5 or vary\$6 or gradient\$5 or gradual\$5 or variat\$5) near15 (anisotrop\$5 near3 ("k" or constant\$5)))	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:02
S77	153	S74 and (exchange\$5 near3 spring\$5)	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:11
S78	12	((("SUESS") near3 ("Dieter"))).INV.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	ON	2019/10/24 15:36
S79	114	(428/827,828,828.1,829).ccls. and ("l10" or l1o or "l1.sub.o" or "l1.sub.0" or "l.sub.10" or "l.sub.1o")	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/25 15:10
S80	406	(428/8\$).ccls. and ("l10" or l1o or "l1.sub.o" or "l1.sub.0" or "l.sub.10" or "l.sub.1o")	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/25 15:24
S81	2	"20070026262"	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/25 15:32
S82	18	("2007/0026262").URPN.	USPAT	ADJ	ON	2019/10/25 15:33
S83	98,570	((G11B5/66 OR G11B5/65 OR G11B5/7325 OR G11B5/667 OR G11B5/82 OR G11B5/656 OR G11B5/84 OR G11B5/855 OR G11B5/7379 OR G11B5/746 OR G11B5/851 OR	US-PGPUB; USPAT; USOCR	ADJ	ON	2020/09/01 12:33

		G11B2005/0021 OR G11B2005/0024 OR G11B5/64 OR G11B5/653 OR G11B5/73 OR G11B5/1278 OR G11B5/8404 OR G11B5/314 OR G11B5/743 OR G11B5/3909 OR G11B5/72 OR G11B5/7315 OR G11B2005/0029 OR G11B2005/3996 OR G11B20/10 OR G11B5/1276 OR G11B5/85 OR G11B2020/10898 OR G11B2020/1281 OR G11B20/1217 OR G11B2220/235 OR G11B2220/2516 OR G11B5/127 OR G11B5/1272 OR G11B5/235 OR G11B5/3113 OR G11B5/3133 OR G11B5/3146 OR G11B5/3153 OR G11B5/3163 OR G11B5/3906 OR G11B5/3912 OR G11B5/3929 OR G11B5/6088 OR G11B5/645 OR G11B5/647 OR G11B5/706 OR G11B5/70605 OR G11B5/708 OR G11B5/716 OR G11B5/735 OR G11B5/865 OR H01F10/3286 OR H01F10/123 OR H01F10/3254 OR H01F10/3272 OR H01F10/329 OR H01F10/3295 OR H01F10/30 OR H01F41/0206 OR H01F10/12 OR H01F10/3218 OR H01F10/324 OR H01F41/18 OR H01F41/30 OR H01F41/302 OR H01F41/303 OR H01F41/305 OR H01F41/32 OR Y10T428/115 OR Y10T29/4902 OR Y10T29/49032 OR Y10T29/49067 OR Y10T428/12458 OR Y10T428/12465 OR Y10T428/12931 OR Y10T428/26 OR Y10T428/265 OR Y10T156/10 OR Y10T29/49021 OR Y10T29/49043 OR Y10T29/49044 OR Y10T29/49048 OR Y10T29/49052 OR Y10T428/11 OR Y10T428/1107 OR Y10T428/1114 OR Y10T428/1121 OR Y10T428/1143 OR Y10T428/24273 OR Y10T428/315 OR Y10T83/04).CPC.)				
S84	58	S83 and ((varies\$5 or vary\$6 or gradient\$5 or gradual\$5 or variat\$5) near15 (anisotrop\$5 near3 ("k" or constant\$5)))	US-PGPUB; USPAT; USOCR	ADJ	ON	2020/09/01 12:33
S85	99,336	((G11B5/66 OR G11B5/65 OR G11B5/7325 OR G11B5/667 OR G11B5/82 OR G11B5/656 OR G11B5/84 OR G11B5/855 OR G11B5/7379 OR G11B5/746 OR G11B5/851 OR G11B2005/0021 OR G11B2005/0024 OR G11B5/64 OR G11B5/653 OR G11B5/73 OR G11B5/1278 OR G11B5/8404 OR	US-PGPUB; USPAT; USOCR	ADJ	ON	2021/05/18 11:18

		G11B5/314 OR G11B5/743 OR G11B5/3909 OR G11B5/72 OR G11B5/7315 OR G11B2005/0029 OR G11B2005/3996 OR G11B20/10 OR G11B5/1276 OR G11B5/85 OR G11B2020/10898 OR G11B2020/1281 OR G11B20/1217 OR G11B2220/235 OR G11B2220/2516 OR G11B5/127 OR G11B5/1272 OR G11B5/235 OR G11B5/3113 OR G11B5/3133 OR G11B5/3146 OR G11B5/3153 OR G11B5/3163 OR G11B5/3906 OR G11B5/3912 OR G11B5/3929 OR G11B5/6088 OR G11B5/645 OR G11B5/647 OR G11B5/706 OR G11B5/70605 OR G11B5/708 OR G11B5/716 OR G11B5/735 OR G11B5/865 OR H01F10/3286 OR H01F10/123 OR H01F10/3254 OR H01F10/3272 OR H01F10/329 OR H01F10/3295 OR H01F10/30 OR H01F41/0206 OR H01F10/12 OR H01F10/3218 OR H01F10/324 OR H01F41/18 OR H01F41/30 OR H01F41/302 OR H01F41/303 OR H01F41/305 OR H01F41/32 OR Y10T428/115 OR Y10T29/4902 OR Y10T29/49032 OR Y10T29/49067 OR Y10T428/12458 OR Y10T428/12465 OR Y10T428/12931 OR Y10T428/26 OR Y10T428/265 OR Y10T156/10 OR Y10T29/49021 OR Y10T29/49043 OR Y10T29/49044 OR Y10T29/49048 OR Y10T29/49052 OR Y10T428/11 OR Y10T428/1107 OR Y10T428/1114 OR Y10T428/1121 OR Y10T428/1143 OR Y10T428/24273 OR Y10T428/315 OR Y10T83/04).CPC.)				
S86	3,792	S85 and ((varies\$5 or vary\$6 or gradient\$5 or gradual\$5 or variat\$5) near15 ((anisotrop\$5 near3 ("k" or constant\$5))) or ku or "ku.sub."\$2)	US-PGPUB; USPAT; USOCR	ADJ	ON	2021/05/18 11:18
S87	113	S85 and ((varies\$5 or vary\$6 or gradient\$5 or gradual\$5 or variat\$5) near15 ((anisotrop\$5 near3 ("k" or constant\$5))) or ku or "ku.sub."\$2))	US-PGPUB; USPAT; USOCR	ADJ	ON	2021/05/18 11:23
S94	32	(US-20040053078-\$ US-20040057156-\$ US-20050058855-\$ US-20070292720-\$ US-0051287-\$ US-0053078-\$ US- 0057156-\$ US-0058855-\$ US-0191576- \$ US-0211689-\$ US-0292720-\$ US- 0605368-\$ US-20010051287-\$ US-	US-PGPUB; USPAT; USOCR	ADJ	ON	2021/05/18 11:33

		20040191576-\$ US-20180211689-\$ US-2335590-\$ US-5583727-\$ US-5851643-\$ US-6280813-\$ US-6383668-\$ US-6468670-\$ US-7550210-\$ US-7687157-\$).DID.				
S95	1	("20180211689").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2021/05/18 11:40

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S61	4,074	(coercivity or (coerciv\$4 near5 (field for force)) or hc\$3 or "h.sub.c"\$5) same (magnet\$5 or ferro\$5magnet\$5).clm.	US-PGPUB; USPAT	ADJ	ON	2017/10/02 15:34
S62	11,352	((gradient or gradual\$5 or increas\$5 or decreas\$5) same (anisotrop\$5 or anisotrop\$5 near5 constant\$5 or ku or ku\$2 or "ku.sub."\$2 or k!)).clm.	US-PGPUB; USPAT	ADJ	ON	2017/10/02 15:37
S63	39	S61 and S62	US-PGPUB; USPAT	ADJ	ON	2017/10/02 15:37
S64	81	grad\$4 near3 anisotrop\$5.clm.	US-PGPUB; USPAT	ADJ	ON	2017/10/02 15:53
S65	38	S64 and (magnet\$5 or ferro\$5magnet\$5).clm.	US-PGPUB; USPAT	ADJ	ON	2017/10/02 15:54
S66	418	exchange\$5 near4 spring.clm.	US-PGPUB; USPAT	ADJ	ON	2017/10/02 15:55
S67	10	S61 and S66	US-PGPUB; USPAT	ADJ	ON	2017/10/02 15:56
S88	4,677	(coercivity or (coerciv\$4 near5 (field for force)) or hc\$3 or "h.sub.c"\$5) same (magnet\$5 or ferro\$5magnet\$5).clm.	US-PGPUB; USPAT	ADJ	ON	2021/05/18 11:06
S89	14,386	((gradient or gradual\$5 or increas\$5 or decreas\$5) same (anisotrop\$5 or anisotrop\$5 near5 constant\$5 or ku or ku\$2 or "ku.sub."\$2 or k!)).clm.	US-PGPUB; USPAT	ADJ	ON	2021/05/18 11:06
S91	61	S88 and S89	US-PGPUB; USPAT	ADJ	ON	2021/05/18 11:11

S92	494	exchange\$5 near4 spring.clm.	US- PGPUB; USPAT	ADJ	ON	2021/05/18 11:17
S93	3	S89 and S92	US- PGPUB; USPAT	ADJ	ON	2021/05/18 11:17

5/18/2021 11:46:55 AM

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PTO/SB/08a (07-09)

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Substitute for form 1449/PTO		Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)		Application Number	15/925,749
		Filing Date	03/19/2018
		First Named Inventor	Dieter SUESS
		Art Unit	1785
		Examiner Name	Lisa N. CHAU
Sheet 1 of 3	Attorney Docket Number	SUSP02US2	

U. S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
		US- 2001/0051287 A1	12-13-2001	Kikitsu, et al.	
		US- 2004/0053078	03-18-2004	Kikitsu, et al.	
		US- 2004/0057156	03-25-2004	Lee, et al.	
		US- 2004/0191576	09-30-2004	Shimizu, et al.	
		US- 2005/0058855	03-17-2005	Girt, Erol	
		US- 2007/0292720 A1	12-20-2007	Suess, Dieter	
		US- 2018/0211689 A1	07-26-2018	Suess, Dieter	
		US- 5,583,727	12-10-1996	Parkin	
		US- 5,851,643	12-22-1998	Honda, et al.	
		US- 6,280,813 B1	08-28-2001	Carey, et al.	
		US- 6,383,668 B1	05-07-2002	Fullerton, et al.	
		US- 6,468,670 B1	10-22-2002	Ikeda, et al.	
		US- 7,550,210 B2	06-23-2009	Berger, et al.	
		US- 7,687,157 B2	03-30-2010	Berger, et al.	
		US-			
		US-			
		US-			
		US-			
		US-			

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T ⁶
		Country Code ³ -Number ⁴ -Kind Code ⁵ (if known)				

Examiner Signature	/LISA N CHAU/	Date Considered	05/18/2021
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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /L.N.C./

RESONAC HARD DISK CORPORATION and RESONAC CORPORATION

Exhibit 1002

Page 38 of 229

PTO/SB/08b (07-09)

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Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Use as many sheets as necessary)</i>		Complete if Known	
		Application Number	15/925,749
		Filing Date	03/19/2018
		First Named Inventor	Dieter SUESS
		Art Unit	1785
		Examiner Name	Lisa N. CHAU
Sheet 2	of 3	Attorney Docket Number	SUSP02US2

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	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, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
		C. TANNOUS, et al "The Stoner-Wohlfarth Model of Ferromagnetism," European Journal of Physics 29 (2008) 475-487.	
		D. Suess et al., "Optimization of Exchange Spring Perpendicular Recording Media" Intermag Nagoya, April 2005, magnet.aip.tuwien.ac.at, Vienna University of Technology, Austria	
		A. AHARONI; "Intro to the Theory of Ferromagnetism", Oxford Univ Press, Walton St, Oxford OX2 6DP; Published in US by Oxford Univ Press, Inc. NY; ©Amikam Aharoni 1996, 3 pgs.	
		D. Suess et al., "Exchange spring media for perpendicular recording." Applied Physics Letters 87(2005): 012504-1 to 012504-3.	
		Suess et al. "Exchange spring recording media for areal densities up to 10 Tbit/in ² " Journal of Magnetism and Magnetic Materials (2004): 551-554.	
		JAN-ULRICH THIELE, et al; "FeRh/FePt exchange spring films for thermally assisted magnetic recording media", Appl. Phys. Lett, Vol 82, No. 17, 28 April 2003, pages 2859-2861.	
		R.H. VICTORA, et al; "Composite Media for Perpendicular Magnetic Recording," IEEE Transactions on Magnetics, Vol. 41, No. 2, pages.537-542, February 2005.	
		JIAN-PING WANG, et al; "Composite media (dynamic tilted media) for magnetic recording," Applied Physics Letters, 86, 2005, pages 142504-1 - 142504-3	
		Y. INABA, et al; "Preliminary Study on (CoPtCr/NiFe)-SiO ₂ Hard/Soft-Stacked Perpendicular Recording Media", IEEE Trans. on Magnetics, Vol. 41, No. 10, Oct. 2005, pgs 3136-3138	
		A. Y. DOBIN, et al; "Domain Wall Assisted Magnetic Recording", Cond-mat.mtrl-sci, DOI: 10.1063/1.2335590; arXiv:cond-mat/0605368 v1 15 May 2006, 3 pages.	

Examiner Signature	/LISA N CHAU/	Date Considered	05/18/2021
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¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /L.N.C/

RESONAC HARD DISK CORPORATION and RESONAC CORPORATION

Exhibit 1002

Page 39 of 229

PTO/SB/08b (07-09)

Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Use as many sheets as necessary)</i>		Complete if Known	
		Application Number	15/925,749
		Filing Date	03/19/2018
		First Named Inventor	Dieter SUESS
		Art Unit	1785
		Examiner Name	Lisa N. CHAU
Sheet 3	of 3	Attorney Docket Number	SUSP02US2

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	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, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
		P.N. LOXLEY, et al; "Theory of Domain Wall Nucleation in a Two Section Magnetic Wire", IEEE Transactions on Magnetism, Vol. 37, No. 4, July 2001, pages 2098-2100.	
		F.B. HAGEDORN; "Analysis of Exchange-Coupled Magnetic Thin Films," Journal of Applied Physics, Vol. 41, No. 6, May 1970, pages 2491-2502.	
		DIETER SUESS; "Micromagnetics of Exchange Spring Media: Optimization and Limits," Submitted to Journal of Magnetism and Magnetic Materials, Volume 308, Issue 2, January 2007	
		D. SUESS, et al; "Exchange spring recording media for areal densities up to 10 Tbit/in ² ," Journal of Magnetism and Magnetic Materials, 290-291 (2005), 551-554; Available online	
		D. SUESS; "Multilayer Exchange Spring Media for Magnetic Recording," Submitted to Applied Physics letters, submitted, 2006-06-03, pages 1-9	
		TERUFUMI SASAKI, et al.; "Magnetic Properties of Fe ₃ Pt Invar Alloy," Journal of the Physical Society of Japan, Vol. 46, No. 6, June 1979, pages 1732-1739	
		"Introduction to the Theory of Ferromagnetism," in International Series of Monographs on Physics editor Amikan Aharoni, Oxford Science Publication, 1996, 5 pages.	

Examiner Signature	/LISA N CHAU/	Date Considered	05/18/2021
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RESONAC HARD DISK CORPORATION and RESONAC CORPORATION

Exhibit 1002

Page 40 of 229

Application Number * 15/925,749 *	Application/Control No. 15/925,749	Applicant(s)/Patent under Reexamination Suess, Dieter	
	Examiner CHAU, LISA N	Art Unit 1785	
Document Code - DISQ		Internal Document - DO NOT MAIL	

TERMINAL DISCLAIMER	☒ APPROVED	☐ DISAPPROVED
Date Filed: <u>05 February 2021</u>	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:
/PAMELA A YOUNG/ Technology Center: <u>OPLC</u> Telephone: <u>(571)272-3622</u>

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Substitute for form 1449/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Sheet 1 of 3

Complete if Known

Application Number	15/925,749
Filing Date	03/19/2018
First Named Inventor	Dieter SUESS
Art Unit	1785
Examiner Name	Lisa N. CHAU
Attorney Docket Number	SUSP02US2

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
		US- 2001/0051287 A1	12-13-2001	Kikitsu, et al.	
		US- 2004/0053078	03-18-2004	Kikitsu, et al.	
		US- 2004/0057156	03-25-2004	Lee, et al.	
		US- 2004/0191576	09-30-2004	Shimizu, et al.	
		US- 2005/0058855	03-17-2005	Girt, Erol	
		US- 2007/0292720 A1	12-20-2007	Suess, Dieter	
		US- 2018/0211689 A1	07-26-2018	Suess, Dieter	
		US- 5,583,727	12-10-1996	Parkin	
		US- 5,851,643	12-22-1998	Honda, et al.	
		US- 6,280,813 B1	08-28-2001	Carey, et al.	
		US- 6,383,668 B1	05-07-2002	Fullerton, et al.	
		US- 6,468,670 B1	10-22-2002	Ikeda, et al.	
		US- 7,550,210 B2	06-23-2009	Berger, et al.	
		US- 7,687,157 B2	03-30-2010	Berger, et al.	
		US-			
		US-			
		US-			
		US-			
		US-			

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T ⁶
		Country Code ³ Number ⁴ Kind Code ⁵ (if known)				

Examiner
SignatureDate
Considered

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Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Use as many sheets as necessary)</i>		Complete if Known	
		Application Number	15/925,749
		Filing Date	03/19/2018
		First Named Inventor	Dieter SUESS
		Art Unit	1785
		Examiner Name	Lisa N. CHAU
Sheet 2	of 3	Attorney Docket Number	SUSP02US2

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	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, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
		C. TANNOUS, et al "The Stoner-Wohlfarth Model of Ferromagnetism," European Journal of Physics 29 (2008) 475-487.	
		D. Suess et al., "Optimization of Exchange Spring Perpendicular Recording Media" Intermag Nagoya, April 2005, magnet.aip.tuwien.ac.at, Vienna University of Technology, Austria	
		A. AHARONI; "Intro to the Theory of Ferromagnetism", Oxford Univ Press, Walton St, Oxford OX2 6DP; Published in US by Oxford Univ Press, Inc. NY; ©Amikam Aharoni 1996, 3 pgs.	
		D. Suess et al., "Exchange spring media for perpendicular recording." Applied Physics Letters 87(2005): 012504-1 to 012504-3.	
		Suess et al. "Exchange spring recording media for areal densities up to 10 Tbit/in ² " Journal of Magnetism and Magnetic Materials (2004): 551-554.	
		JAN-ULRICH THIELE, et al; "FeRh/FePt exchange spring films for thermally assisted magnetic recording media", Appl. Phys. Lett, Vol 82, No. 17, 28 April 2003, pages 2859-2861.	
		R.H. VICTORA, et al; "Composite Media for Perpendicular Magnetic Recording," IEEE Transactions on Magnetics, Vol. 41, No. 2, pages.537-542, February 2005.	
		JIAN-PING WANG, et al; "Composite media (dynamic tilted media) for magnetic recording," Applied Physics Letters, 86, 2005, pages 142504-1 - 142504-3	
		Y. INABA, et al; "Preliminary Study on (CoPtCr/NiFe)-SiO ₂ Hard/Soft-Stacked Perpendicular Recording Media", IEEE Trans. on Magnetics, Vol. 41, No. 10, Oct. 2005, pgs 3136-3138	
		A. Y. DOBIN, et al; "Domain Wall Assisted Magnetic Recording", Cond-mat.mtrl-sci, DOI: 10.1063/1.2335590; arXiv:cond-mat/0605368 v1 15 May 2006, 3 pages.	

Examiner Signature		Date Considered	
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		Application Number	15/925,749
		Filing Date	03/19/2018
		First Named Inventor	Dieter SUESS
		Art Unit	1785
		Examiner Name	Lisa N. CHAU
Sheet 3	of 3	Attorney Docket Number	SUSP02US2

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	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, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
		P.N. LOXLEY, et al; "Theory of Domain Wall Nucleation in a Two Section Magnetic Wire", IEEE Transactions on Magnetism, Vol. 37, No. 4, July 2001, pages 2098-2100.	
		F.B. HAGEDORN; "Analysis of Exchange-Coupled Magnetic Thin Films," Journal of Applied Physics, Vol. 41, No. 6, May 1970, pages 2491-2502.	
		DIETER SUESS; "Micromagnetics of Exchange Spring Media: Optimization and Limits," Submitted to Journal of Magnetism and Magnetic Materials, Volume 308, Issue 2, January 2007	
		D. SUESS, et al; "Exchange spring recording media for areal densities up to 10 Tbit/in ² ", Journal of Magnetism and Magnetic Materials, 290-291 (2005), 551-554; Available online	
		D. SUESS; "Multilayer Exchange Spring Media for Magnetic Recording," Submitted to Applied Physics letters, submitted, 2006-06-03, pages 1-9	
		TERUFUMI SASAKI, et al.; "Magnetic Properties of Fe ₃ Pt Invar Alloy," Journal of the Physical Society of Japan, Vol. 46, No. 6, June 1979, pages 1732-1739	
		"Introduction to the Theory of Ferromagnetism," in International Series of Monographs on Physics editor Amikan Aharoni, Oxford Science Publication, 1996, 5 pages.	

Examiner Signature		Date Considered	
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Electronic Patent Application Fee Transmittal				
Application Number:		15925749		
Filing Date:		19-Mar-2018		
Title of Invention:		MULTILAYER EXCHANGE SPRING RECORDING MEDIA		
First Named Inventor/Applicant Name:		Dieter Suess		
Filer:		Gergely T. Zimanyi/Richard Pask		
Attorney Docket Number:		SUSP02US2		
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
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(\$)
Extension - 2 months with \$0 paid	2252	1	320	320
Miscellaneous:				
RCE- 1ST REQUEST	2801	1	680	680
STATUTORY OR TERMINAL DISCLAIMER	2814	3	170	510
Total in USD (\$)				1510

Electronic Acknowledgement Receipt	
EFS ID:	41855007
Application Number:	15925749
International Application Number:	
Confirmation Number:	8424
Title of Invention:	MULTILAYER EXCHANGE SPRING RECORDING MEDIA
First Named Inventor/Applicant Name:	Dieter Suess
Customer Number:	143793
Filer:	Gergely T. Zimanyi/Richard Pask
Filer Authorized By:	Gergely T. Zimanyi
Attorney Docket Number:	SUSP02US2
Receipt Date:	05-FEB-2021
Filing Date:	19-MAR-2018
Time Stamp:	18:28:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 1510
RAM confirmation Number	E202125I31252693
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		1_SUSP02US2_Response_to_Final_Office_Action.pdf	6621444	yes	13
			97d6d3cccb43f9781f36c7ef0e18fa80108da58		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Amendment Submitted/Entered with Filing of CPA/RCE		1	1	
	Specification		2	5	
	Claims		6	10	
	Applicant Arguments/Remarks Made in an Amendment		11	13	
Warnings:					
Information:					
2	Request for Continued Examination (RCE)	2_SUSP02US2_Request_for_Continued_Examination.pdf	508542	no	1
			902ad7356635d0d60effd087bbe9e9ca797472b1		
Warnings:					
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Information:					
3	Extension of Time	3_SUSP02US2_Petition_for_Extension_of_Time.pdf	446396	no	1
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Warnings:					
Information:					
4	Terminal Disclaimer Filed	4_SUSP02US2_Terminal_Disclaimers.pdf	867175	no	3
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Warnings:					
Information:					

5	Transmittal Letter	5_SUSP02US2_IDS_Transmittal_Letter.pdf	1762762	no	5
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Warnings:					
Information:					
6	Information Disclosure Statement (IDS) Form (SB08)	6_SUSP02US2_PTO_SB08_forms.pdf	1448636	no	3
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Information:					
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7	Non Patent Literature	7_SUSP02US2_NPL_Ref_1_Tanous.pdf	983421	no	14
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Information:					
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Information:					
9	Non Patent Literature	9_SUSP02US2_NPL_Ref_3_Ferrromagnetism.pdf	801451	no	3
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Information:					
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Information:					
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Information:					

12	Non Patent Literature	12_SUSP02US2_NPL_Ref_6_FeRh_FePt.pdf	316301	no	3
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Information:					
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Information:					
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Information:					
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Information:					
18	Non Patent Literature	18_SUSP02US2_NPL_Ref_12_Hagedorn.pdf	1644478	no	12
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Information:					

19	Non Patent Literature	19_SUSP02US2_NPL_Ref_13_Suess_Micromagnetics.pdf	8074442	no	49
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Warnings:					
Information:					
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Warnings:					
Information:					
21	Fee Worksheet (SB06)	fee-info.pdf	33994	no	2
			d3031b23773fd7f795dc2c2ff9807326041aea88f		
Warnings:					
Information:					
Total Files Size (in bytes):			27064216		
<p>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.</p> <p><u>New Applications Under 35 U.S.C. 111</u> 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.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> 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.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> 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.</p>					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s):	Dieter SUESS	Examiner:	Lisa N. CHAU
Application No.:	15/925,749	Art Unit:	1785
Filing Date:	03/19/2018	Confirmation No.:	8424
		Docket No.:	SUSP02US2
		Customer No.:	143793
		Date:	02/05/2021

Title: **MULTILAYER EXCHANGE SPRING RECORDING MEDIA**

Mail Stop RCE

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

RESPONSE TO FINAL OFFICE ACTION

Dear Examiner Chau:

This document is filed in response to the Final Office Action mailed 09/10/2020. Since this document is filed on 02/05/2021, a two months extension of time is hereby respectfully requested. Further, since this was a Final Office Action, a Request of Continued Examination is hereby respectfully submitted as well.

Applicant respectfully requests the reconsideration of the pending claims in light of the herewith submitted amendments and remarks.

Amendments to the Specification starts at p. 2. Amendments to the Claims start on p. 6.

Remarks start on p. 11.

SPECIFICATION

In the Amendment filed 07/24/2020, Applicant inserted paragraphs [0056]-[0076] into the Specification, copying the text of the originally filed claims 26-45, modified only for grammar as needed.

Please insert the below new paragraphs [0077]-[0101] after present paragraph [0076] and before present paragraph [0077], copying the text of originally filed claims 1-25, modified only for grammar as needed. Since the entire text of paragraphs [0077]-[0101] is new, for clarity's sake, the underlining of the entire text has been omitted.

“[0077] In some embodiments, as described throughout this specification, a magnetic recording medium is comprising: an essentially non-magnetic substrate; and an exchange coupled magnetic multilayer structure, comprising: a nucleation host with an anisotropy varying in the film normal direction; and a hard magnetic storage layer; wherein the anisotropy assumes more than one value in substantial magnetic portions of the nucleation host.

[0078] In some embodiments of the magnetic recording medium, an exchange coupling between the nucleation host and the hard magnetic storage layer is sufficiently strong and the nucleation host is sufficiently hard so that the derivative k of the normalized magnetization with respect to the external field normalized to the coercive field does not change by more than a factor of 3 in a magnetization interval $-0.7 < M_z/M_s < 0.7$, wherein:

$$k = \frac{dM}{dH} \frac{H_c}{M_s}$$

M being a magnetization of the recording medium, M_z being a component of the magnetization perpendicular to a plane of the recording medium, H being an external magnetic field parallel to a normal of the layers, dM/dH being the derivative of the magnetization with respect to the external magnetic field, H_c being a coercive field, M_s being a saturation magnetization.

[0079] In some embodiments of the magnetic recording medium, the nucleation host and the hard magnetic storage layer are in direct contact.

[0080] In some embodiments of the magnetic recording medium, the nucleation host, comprises of ferromagnetic layers with increasing anisotropy from layer to layer.

[0081] In some embodiments of the magnetic recording medium, the nucleation host, comprises a ferromagnetic layer with a continuous change of anisotropy in the film normal direction.

[0082] In some embodiments of the magnetic recording medium, the nucleation host and the hard magnetic storage layers comprise ferromagnetic layers with increasing anisotropy values.

[0083] In some embodiments of the magnetic recording medium, the hard magnetic storage layer comprises at least one of Cr, Pt, Ta, B, Fe, Cu, Ag, W, Mo, Ru, Si, Ge, Nb, Co, Pd, Sm, Nd, Dy, Hf, Mn and Ni.

[0084] In some embodiments of the magnetic recording medium, a coercive field of the nucleation host is less than $\frac{1}{2}$ of a coercive field of the hard magnetic storage layer.

[0085] In some embodiments of the magnetic recording medium, a $H_c(\alpha=20^\circ) < H_c(\alpha=45^\circ)$, wherein $H_c(\alpha)$ is the coercive field if the angle between the external field and the film normal is α .

[0086] In some embodiments of the magnetic recording medium, a $H_m(\alpha=20^\circ) < H_m(\alpha=45^\circ)$, wherein $H_m(\alpha)$ is the required field to reduce the normalized magnetization from the saturation to -0.5 if the angle between the external field and the film normal is α .

[0087] In some embodiments of the magnetic recording medium, the nucleation host comprises at least one of Fe, Ni, Al, Si, B, Co, Cr, Pt, Ta, Cu, Ag, W, Mo, Ru, Si, Ge, Nb, Co, Pd, Sm, Nd, Dy, Hf, Mn, Ni and O.

[0088] In some embodiments of the magnetic recording medium, the nucleation host has a thickness smaller than 30 nm.

[0089] In some embodiments of the magnetic recording medium, the nucleation host comprises grains with an average diameter greater than 2 nm and less than 10 nm.

[0090] In some embodiments of the magnetic recording medium, a height of a plurality of grains is greater than a diameter of the grains.

[0091] In some embodiments of the magnetic recording medium, the nucleation host is in direct contact with the hard magnetic storage layer.

[0092] In some embodiments of the magnetic recording medium, the nucleation host is separated from the hard magnetic storage layer by a layer of thickness less than 5 nm.

[0093] In some embodiments of the magnetic recording medium, the nucleation host is coupled to the hard magnetic storage layer by a strong exchange coupling layer.

[0094] In some embodiments of the magnetic recording medium, the nucleation host is coupled to the hard magnetic layer by antiferromagnetic coupling.

[0095] In some embodiments of the magnetic recording medium, parameters of the medium comprise: an anisotropy constant in the nucleation host K^n_1 as a function of the layer depth a hard magnetic storage layer anisotropy constant K^h_1 ; a nucleation host grain diameter; a hard magnetic storage layer grain diameter; an exchange constant between grains in the nucleation host; an exchange constant between grains of the hard magnetic storage layer; a saturation polarization in the nucleation host as a function of the layer depth; a saturation polarization of the hard magnetic storage layer; a layer thickness of the nucleation host; a layer thickness of the magnetic storage layer and an exchange constant between the nucleation host and the hard magnetic layer.

[0096] In some embodiments of the magnetic recording medium, a parameter of the magnetic multilayer has a value such that a coercive magnetic field of the hard magnetic storage layer is less than $\frac{1}{2}$ of the coercive magnetic field of the hard magnetic storage layer without the nucleation host.

[0097] In some embodiments of the magnetic recording medium, a parameter of the magnetic multilayer has a value such that an energy barrier of a typical grain of the hard magnetic storage layer is smaller at most by 25% of the energy barrier of a typical grain of the hard magnetic storage layer without the nucleation host.

[0098] In some embodiments of the magnetic recording medium, an energy barrier of the hard magnetic storage layer is determined by at least one of: depositing only the hard magnetic storage layer on the non-magnetic substrate; removing the nucleation host from the multilayer structure; and performing a micromagnetic calculation with parameters appropriate for the multilayer.

[0099] In some embodiments of the magnetic recording medium, a parameter of the magnetic multilayer has a value such that a coercive field of the magnetic multilayer increases when grains of the recording media are misaligned relative to a normal of the non-magnetic substrate.

[0100] In some embodiments of the magnetic recording medium, the thickness of the nucleation host has a value such that the in plane component of a magnetization of a remanent state is less than 20% of a total magnetization.

[0101] In some embodiments of the magnetic recording medium, the recording medium is usable for at least one of perpendicular recording or recording on patterned elements.”

Further, to accommodate the insertion of new paragraphs **[0077]**-**[0101]**, please renumber presently numbered paragraph **[0077]** to **[0102]**, without any modification to its text, as follows:

“~~**[0077]**~~ **[0102]** While the present invention has been particularly shown and described with reference to certain embodiments, it will be understood by those skilled in the art that various changes in form and detail may be made without departing from the spirit and scope of the invention. Accordingly, the disclosure was intended merely as illustrative and the scope of the invention is limited only as specified in the appended claims.”

CLAIMS

1. (Original) A magnetic recording system, comprising:
a writing head; and
a disk, including a magnetic recording medium, comprising
 an essentially non-magnetic substrate
 an underlayer formed on the non-magnetic substrate; and
 an exchange coupled magnetic multilayer structure, including
 a hard magnetic storage layer, having a first coercive field $H_s > 0.5$ T, formed on the underlayer; and
 a nucleation host, having a second coercive field H_n without the hard magnetic storage layer, lower than the first coercive field, $H_n < H_s$, wherein
 said nucleation host
 is formed on the hard magnetic storage layer such that the hard magnetic storage layer is between the nucleation host and the non-magnetic substrate,
 is exchange coupled to the hard magnetic storage layer, and
 comprises ferromagnetic layers with increasing anisotropy constant K from layer to layer.
2. (Original) The magnetic recording system of claim 1, wherein:
 the nucleation host and the hard magnetic storage layer are in direct contact.
3. (Cancelled)
4. (Previously amended) The magnetic recording system of claim 1, wherein:
 $H_c(\alpha = 20^\circ) < H_c(\alpha = 45^\circ)$, wherein $H_c(\alpha)$ is a coercive field of the magnetic recording medium if an angle between an external field and a normal of the magnetic recording medium is α .

5. (Original) The magnetic recording system of claim 1, wherein:
the nucleation host comprises grains with an average diameter greater than 2 nm and less than 10 nm.
6. (Original) The magnetic recording system of claim 1, wherein:
a coupling layer is disposed between the nucleation host and the hard magnetic storage layer.
7. (Original) The magnetic recording system of claim 1, wherein:
the nucleation host is separated from the hard magnetic storage layer by a layer of thickness less than 5 nm.
8. (Original) A magnetic recording medium, comprising:
an essentially non-magnetic substrate;
an underlayer formed on the non-magnetic substrate; and
an exchange coupled magnetic multilayer structure, including
a hard magnetic storage layer, having a first coercive field $H_s > 0.5$ T, formed on the underlayer; and
a nucleation host, having a second coercive field H_n without the hard magnetic storage layer, lower than the first coercive field, $H_n < H_s$, wherein
said nucleation host
is formed on the hard magnetic storage layer such that the hard magnetic storage layer is between the nucleation host and the non-magnetic substrate,
is exchange coupled to the hard magnetic storage layer, and
comprises ferromagnetic layers with increasing anisotropy constant K from layer to layer, wherein at least two of the ferromagnetic layers are coupled with a thin exchange coupling layer.
9. (Cancelled)
10. (Cancelled)

11. (Original) The magnetic recording medium of claim 8, wherein:

$H_c(\alpha=20^\circ) < H_c(\alpha=45^\circ)$, wherein $H_c(\alpha)$ is a coercive field of the recording medium if an angle between an external field and a normal of the recording medium is α .

12. (Original) The magnetic recording medium of claim 8, wherein:

the nucleation host comprises grains with an average diameter greater than 2 nm and less than 10 nm.

13. (Withdrawn) A magnetic recording medium, comprising:

an essentially non-magnetic substrate;

an underlayer formed on the non-magnetic substrate; and

an exchange coupled magnetic multilayer structure, including

a hard magnetic storage layer, formed from a large perpendicular anisotropy material based on at least one of Fe and Co, having a first coercive field H_s , formed on the underlayer; and

a nucleation host, having a second coercive field H_n without the hard magnetic storage layer, lower than the first coercive field, $H_n < H_s$, wherein

said nucleation host

is formed on the hard magnetic storage layer such that the hard magnetic storage layer is between the nucleation host and the non-magnetic substrate,

is exchange coupled to the hard magnetic storage layer, and

comprises ferromagnetic layers with increasing anisotropy constant K from layer to layer.

14. (Withdrawn) The magnetic recording medium of claim 13, wherein:

the large perpendicular anisotropy material is an FePt based alloy.

15. (Withdrawn) The magnetic recording medium of claim 13, wherein:

the large perpendicular anisotropy material is an L1₀-ordered phase material.

16. (Withdrawn) The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material is one of a CoPt based alloy, and a CoPtCr alloy.

17. (Withdrawn) The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material is one of a CoPtCrB, CoPtCrTa, and CoCr based granular media.

18. (Withdrawn) The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material is an alloy based on FePt--X, wherein X is one of Ni, Au, Cu, Pd and Ag.

19. (Withdrawn) The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material is an alloy based on CoPt--X, wherein X is one of Ni, Au, Cu, Pd and Ag.

20. (Withdrawn) The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material is a granular composite material based on FePt-C.

21. (Withdrawn) The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material is a granular composite material, selected from the group consisting of FePt-ZrO, FePt--MgO, and FePt--B₂O₃.

22. (Withdrawn) The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material is additionally formed from materials, selected from the group consisting of B, Cu, Ag, W, Mo, Ru, Ge, Nb, Pd, Sm, Nd, Dy, Hf, Mn, Ni.

23. (Withdrawn) The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material includes Silicon.

24. (Withdrawn) The magnetic recording system of claim 13, wherein the nucleation host comprises:

Oxygen.

REMARKS

Claims 1, 2, 4-8 and 11-12 are pending in the present Application. Claims 3, 9 and 10 have been cancelled. Claims 13-24 have been withdrawn.

AMENDMENTS

In the Office Action of 11/04/2019, the Office instructed Applicant "to provide proper antecedent basis for the claimed subject matter". The Office made analogous instructions in previous actions for the parent applications, and accepted the copying of the corresponding originally filed claims into the Specification as correct responses. Therefore, in response, in the filing of 7/24/2020, Applicant copied original claims 26-45 into the Specification, modifying the text only as grammar required. For completeness, with this present filing, Applicant also copies original claims 1-25 into the Specification, again modifying the original claims only as required by grammar.

TERMINAL DISCLAIMER

"The person who signed the terminal disclaimer has failed to state in what capacity it was signed on behalf of the juristic entity, and the person who signed it has not been established as being authorized to act on behalf of the juristic entity. Please see the Terminal Disclaimer review decision on 8/27/2020 for further details."

In response, undersigned Gergely T. Zimanyi filed a Power of Attorney on 10/21/2020 that identified the undersigned as the Agent of Record for Inventor Dieter Suess. The Power of Attorney has been accepted by the Office on 10/23/2020. With this filing, Applicant repeats the filing of the Terminal Disclaimers, properly authorized by the Inventor, as detailed below.

INFORMATION DISCLOSURE STATEMENT

"The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered."

The application 11/424,859 with the earliest filing date in the family, and its divisional 12/619,849, which is the parent of the present Application, both contained a listing of technical

articles in the Specification. Applicant has submitted these technical articles in properly formatted Information Disclosure Statements for both of these applications. With this submission, Applicant again files these technical articles in an accompanying Information Disclosure Statement.

DOUBLE PATENTING REJECTION

“Claims 1, 2, 4-8, 11, and 12 are rejected on the ground of nonstatutory double patenting as being unpatentable over Claims 1-23 of U.S. Patent No. 9928864.”

Applicant recalls that the present application is a continuation of, and therefore claims benefit from commonly owned US 9,928,864. Accordingly, Applicant herewith files a Terminal Disclaimer in compliance with 37 CFR 1.321(c)-(d) to overcome the rejection.

“Claims 1, 2, 4-8, 11, and 12 are provisionally rejected on the ground of nonstatutory double patenting as being unpatentable over Claims 1-26 of copending Application No. 15985661 in view of US Pub. No. 20070243418 ("Fullerton et al.").”

Applicant recalls that the present application is a continuation of, and therefore claims benefit from commonly owned US 9,928,864, which, in turn is a divisional application of, and therefore claims benefit from commonly owned US 9,978,413. The above mentioned copending Application 15/985,661 is also a continuation of the same US 9,978,413. Accordingly, Applicant herewith files a Terminal Disclaimer in compliance with 37 CFR 1.321(c)-(d) to overcome the rejection.

“Claims 1, 2, 4-8, 11, and 12 are rejected on the ground of nonstatutory double patenting as being unpatentable over Claims 1-45 of U.S. Patent No. 9978413 in view of US Pub. No. 20070243418 ("Fullerton et al.").”

Applicant recalls that the present application is a continuation of, and therefore claims benefit from commonly owned US 9,928,864, which, in turn is a divisional application of, and therefore claims benefit from commonly owned US 9,978,413. Accordingly, Applicant herewith files a Terminal Disclaimer in compliance with 37 CFR 1.321(c)-(d) to overcome the rejection.

CONCLUSIONS

In view of the foregoing, Applicant respectfully requests the reconsideration of the pending claims and the withdrawal of the present rejection. All of the claims in the Application are now believed to be allowable. Favorable consideration and a Notice of Allowance are therefore earnestly solicited. If for any reason the Examiner finds the Application other than in condition for allowance, the Examiner is kindly requested to contact the undersigned Gergely T. Zimanyi, Ph.D. at 530-400-3936 to discuss the steps necessary for placing the Application in condition for allowance.

Respectfully submitted,

Date: 02/05/2021

/Gergely T. Zimanyi/
Gergely T. Zimanyi, Ph.D.
Registration No. 45,754

CERTIFICATE OF TRANSMISSION UNDER 37 CFR 1.8
I hereby certify that this correspondence is being transmitted to the
USPTO via EFS-Web on 02/05/2021.

/Richard A. Pask/ 02/05/2021
Richard A. Pask Date

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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

Address to:
Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Application Number	15/925,749
Filing Date	03/19/2018
First Named Inventor	Dieter SUESS
Art Unit	1785
Examiner Name	Lisa N. CHAU
Attorney Docket Number	SUSP02US2

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. See Instruction Sheet for RCEs (not to be submitted to the USPTO) on page 2.

1. **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).

- a. ☐ 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.
- i. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ii. ☐ Other _____
- b. ☒ Enclosed
- i. ☒ Amendment/Reply
- ii. ☐ Affidavit(s)/ Declaration(s)
- iii. ☒ Information Disclosure Statement (IDS)
- iv. ☒ Other Three (3) Terminal Disclaimers

2. **Miscellaneous**

- a. ☐ 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)
- b. ☐ Other _____

3. **Fees**

- The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.
- a. ☐ The Director is hereby authorized to charge the following fees, any underpayment of fees, or credit any overpayments, to Deposit Account No. _____
- i. ☒ RCE fee required under 37 CFR 1.17(e)
- ii. ☒ Extension of time fee (37 CFR 1.136 and 1.17)
- iii. ☒ Other Three (3) Terminal Disclaimer fee (37 CFR 1.20(d))
- b. ☐ Check in the amount of \$ _____ enclosed
- c. ☐ Payment by credit card (Form PTO-2038 enclosed)
- d. ☒ Payment by EFS-Web

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Signature	/Gergely T. Zimanyi/	Date	02/05/2021
Name (Print/Type)	Gergely T. Zimanyi	Registration No.	45,754

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being EFS-Web transmitted to the United States Patent and Trademark Office (USPTO), deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450 or facsimile transmitted to the USPTO on the date shown below.

Signature		Date	
Name (Print/Type)			

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. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop RCE, 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.

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)		Docket Number (Optional) SUSP02US2
Application Number 15/925,749	Filed 03/19/2018	
For MULTILAYER EXCHANGE SPRING RECORDING MEDIA		
Art Unit 1785	Examiner Lisa N. CHAU	

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	Fee	Small Entity Fee	Micro Entity Fee	
☐ One month (37 CFR 1.17(a)(1))	\$220	\$110	\$55	\$ _____
☒ Two months (37 CFR 1.17(a)(2))	\$640	\$320	\$160	\$ 320
☐ Three months (37 CFR 1.17(a)(3))	\$1,480	\$740	\$370	\$ _____
☐ Four months (37 CFR 1.17(a)(4))	\$2,320	\$1,160	\$580	\$ _____
☐ Five months (37 CFR 1.17(a)(5))	\$3,160	\$1,580	\$790	\$ _____

☒ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☐ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to
Deposit Account Number _____.

☒ Payment made via EFS-Web.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71. 37 CFR 3.73(b) statement is enclosed (Form PTO/SB/96).

☒ attorney or agent of record. Registration number **45,754**

☐ attorney or agent acting under 37 CFR 1.34. Registration number _____.

/Gergely T. Zimanyi/ **02/05/2021**

Signature Date

Gergely T. Zimanyi **530-400-3936**

Typed or printed name Telephone Number

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.

☒ * Total of **1** forms are submitted.

This collection of information is required by 37 CFR 1.136(a). 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 6 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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**TERMINAL DISCLAIMER TO OBTAIN A DOUBLE PATENTING
REJECTION OVER A "PRIOR" PATENT**

Docket Number (Optional)
SUSP02US2

In re Application of: Dieter SUESS

Application No.: 15/925,749

Filed: 03/19/2018

For: MULTILAYER EXCHANGE SPRING RECORDING MEDIA

The applicant, Dieter Sues, owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 9,928,864 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

- expires for failure to pay a maintenance fee;
- is held unenforceable;
- is found invalid by a court of competent jurisdiction;
- is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
- has all claims canceled by a reexamination certificate;
- is reissued; or
- is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 45,754

/Gergely T. Zimanyi/
Signature

02/05/2021
Date

Gergely T. Zimanyi
Typed or printed name

Title

530-400-3936
Telephone Number

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

This collection of information is required by 37 CFR 1.321. 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. 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.

TERMINAL DISCLAIMER TO OBVIATE A PROVISIONAL DOUBLE PATENTING REJECTION OVER A PENDING "REFERENCE" APPLICATION	Docket Number (Optional) SUSP02US2
<p>In re Application of: Dieter SUESS</p> <p>Application No.: 15/925,749</p> <p>Filed: 03/19/2018</p> <p>For: MULTILAYER EXCHANGE SPRING RECORDING MEDIA</p> <p>The applicant, <u>Dieter Suess</u>, owner of <u>100</u> percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of any patent granted on pending reference Application Number <u>15/985,661</u>, filed <u>05/21/2018</u>, as the term of any patent granted on said reference application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending reference application. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and any patent granted on the reference application are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.</p> <p>In making the above disclaimer, the applicant does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term of any patent granted on said reference application, "as the term of any patent granted on said reference application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending reference application," in the event that: any such patent granted on the pending reference application expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as shortened by any terminal disclaimer filed prior to its grant.</p> <p>Check either box 1 or 2 below, if appropriate.</p> <p>1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.</p> <p>I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.</p> <p>2. ☒ The undersigned is an attorney or agent of record. Reg. No. <u>45,754</u></p> <div style="margin-top: 20px;"><div style="display: flex; justify-content: space-between;"><div style="width: 60%;"><u>/Gergely T. Zimanyi/</u> Signature</div><div style="width: 30%; text-align: center;"><u>02/05/2021</u> Date</div></div><div style="display: flex; justify-content: space-between; margin-top: 10px;"><div style="width: 60%;"><u>Gergely T. Zimanyi</u> Typed or printed name</div><div style="width: 30%;"></div></div><div style="display: flex; justify-content: space-between; margin-top: 10px;"><div style="width: 60%;"><u></u> Title</div><div style="width: 30%; text-align: center;"><u>530-400-3936</u> Telephone Number</div></div></div> <p>☒ Terminal disclaimer fee under 37 CFR 1.20(d) is included.</p> <p style="text-align: center; margin-top: 20px;">WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.</p>	

This collection of information is required by 37 CFR 1.321. 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. 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.

**TERMINAL DISCLAIMER TO OBTAIN A DOUBLE PATENTING
REJECTION OVER A "PRIOR" PATENT**

Docket Number (Optional)
SUSP02US2

In re Application of: Dieter SUESS

Application No.: 15/925,749

Filed: 03/19/2018

For: MULTILAYER EXCHANGE SPRING RECORDING MEDIA

The applicant, Dieter Sues, owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 9,978,413 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

- expires for failure to pay a maintenance fee;
- is held unenforceable;
- is found invalid by a court of competent jurisdiction;
- is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
- has all claims canceled by a reexamination certificate;
- is reissued; or
- is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 45,754

/Gergely T. Zimanyi/

Signature

02/05/2021

Date

Gergely T. Zimanyi

Typed or printed name

530-400-3936

Telephone Number

Title

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

This collection of information is required by 37 CFR 1.321. 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. 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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s):	Dieter SUESS	Examiner:	Lisa N. CHAU
Application No.:	15/925,749	Art Unit:	1785
Filing Date:	03/19/2018	Confirmation No.:	8424
		Docket No.:	SUSP02US2
		Customer No.:	143793
		Date:	02/05/2021

Title: **MULTILAYER EXCHANGE SPRING RECORDING MEDIA**

Mail Stop RCE

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

INFORMATION DISCLOSURE STATEMENT UNDER
37 CFR § 1.97 & § 1.98

Dear Examiner Chau:

In accordance with 37 CFR § 1.97-1.98, applicants hereby submit an Information Disclosure Statement, including attached forms(s) PTO/SB/08.

Applicants respectfully request that the listed information be considered by the Examiner and be made of record in the above-identified application. Applicants further request that the Examiner initial and return a copy of the attached form(s) PTO/SB/08 in accordance with MPEP §609.

Applicants reserve the right to establish the patentability of the claimed invention over any of the information provided herewith, and/or to prove that this information may not be prior art, and /or to prove that this information may not be enabling for the teachings purportedly offered.

This statement is not intended to represent that a search has been made or that the information cited in the statement is, or is considered to be, prior art or material to patentability as defined in 37 CFR §1.56.

FILING OF INFORMATION DISCLOSURE STATEMENT

☒ **37 CFR §1.97(b)**

This statement is being submitted under 37 CFR §1.97(b) because the IDS is being filed:

- ☐ 1). Within 3 months of the application filing date and is other than a continued prosecution application under § 1.53(d), or
- ☐ 2). Within 3 months of entry of a national stage as set forth in § 1.491, or
- ☐ 3). Before the mail date of a first Office Action on the merits, or
- ☒ 4). Before the mailing of a first Office Action after filing a request for continued examination under § 1.114.

☐ **37 CFR § 1.97(c)**

This statement is being filed after the latest of:

- ☐ 1). Three months beyond the filing date of a national application, or
- ☐ 2). Three months beyond the date of entry of the national stage as set forth in § 1.491 in an international application, or
- ☐ 3). The mailing date of a first Office Action on the merits, but before the mailing date of the earlier of a final Office Action under § 1.113 or a Notice of Allowance under § 1.311, and then either:
 - ☐ A). A fee of \$130.00 as set forth in § 1.17(p) is authorized below, enclosed, or included with the payment of other papers filed together with this statement. or
 - ☐ B). A certification as specified in § 1.97(e) is provided below; thus no fee is required.

☐ **37 CFR § 1.97(d)**

This statement is being filed after the mailing date of a Final Office action, a Notice of Allowance under § 1.311, or an action that otherwise closes prosecution, but on or before payment of the issue fee, and then:

- A). A fee of \$120.00 as set forth in § 1.17(p) is authorized below, enclosed, or payment is included with other papers filed together with this statement

--AND--

- B). A certification as specified in § 1.97(e) is included below.

-2-

STATEMENT UNDER 37 CFR § 1.97(e)

☐ 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. Cite no(s):

☐ 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 § 1.56(c) more than three months prior to the filing of the information disclosure statement.

**CONTENT OF INFORMATION DISCLOSURE STATEMENT UNDER
37 CFR § 1.98**

- ☐ **37 CFR §1.98 (a)(2)(i) and (d), Foreign patent(s) in English cited**
- ☐ 1). A legible copy of each foreign patent or that portion which caused it to be listed is attached.
- ☐ 2). A copy of each foreign patent is not submitted because the publication was previously submitted in the IDS of the following, earlier filed application relied on for an earlier effective filing date:
- ☒ **37 CFR §1.98 (a)(2)(ii), U.S. patents or patent application publication(s) cited**
- ☒ 1). Since not requested by the Office, U.S. patents and U.S. patent application publications are not included.
- ☐ 2). At the request of the Office, a copy of the following U.S. patent or patent application publication is attached:
- ☐ 3). Items identified by a double asterisk (**) on the SB08A are *commonly-owned U.S. patents and U.S. patent application publications.

☒ **37 CFR §1.98 (a)(2)(iii) and (d), English language publication (other than U.S. patents, patent applications, or pending unpublished applications) cited**

☒ **1).** A legible copy of each publication or that portion which caused it to be listed is attached.

☐ **2).** A copy of each publication or that portion which caused it to be listed is not submitted because the publication was previously submitted in the IDS of the following, earlier filed application relied on for an earlier effective filing date:

FEE AUTHORIZATION

No fees are due at this time as this Information Disclosure Statement is being filed with a Request for Continued Examination under § 1.114.

Respectfully submitted,

Date: 02/05/2021

/Gergely T. Zimanyi/
Gergely T. Zimanyi, Ph.D.
Registration No. 45,754

CERTIFICATE OF TRANSMISSION UNDER 37 CFR 1.8	
I hereby certify that this correspondence is being transmitted to the USPTO via EFS-Web on 02/05/2021.	
<u>/Richard A. Pask/</u>	<u>02/05/2021</u>
Richard A. Pask	Date

Gergely T. Zimanyi
11 Dartmouth Drive
Berkeley, CA 94705
Telephone: 530-400-3936
Email: gzimanyi@gmail.com

Electronic Acknowledgement Receipt	
EFS ID:	41855066
Application Number:	15925749
International Application Number:	
Confirmation Number:	8424
Title of Invention:	MULTILAYER EXCHANGE SPRING RECORDING MEDIA
First Named Inventor/Applicant Name:	Dieter Suess
Customer Number:	143793
Filer:	Gergely T. Zimanyi/Richard Pask
Filer Authorized By:	Gergely T. Zimanyi
Attorney Docket Number:	SUSP02US2
Receipt Date:	05-FEB-2021
Filing Date:	19-MAR-2018
Time Stamp:	18:34:49
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	21_SUSP02US2_NPL_Ref_15_S uess_Multilayer.pdf	318879 6b83862d4cb40d9f0554f69ead93279796af b286	no	9

Warnings:

Information:					
2	Non Patent Literature	22_SUSP02US2_NPL_Ref_16_S asaki.pdf	814208 d3782ca262b38de9f4b993b6579ababbb0 acd13c	no	8
Warnings:					
Information:					
3	Non Patent Literature	23_SUSP02US2_NPL_Ref_17_In troduction.pdf	2061139 90d77aff9b1356752d4dec864316bbd26b2 cc3c2	no	5
Warnings:					
Information:					
Total Files Size (in bytes):			3194226		
<p>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.</p> <p><u>New Applications Under 35 U.S.C. 111</u> 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.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> 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.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> 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.</p>					

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875			Application or Docket Number 15/925,749		Filing Date 03/19/2018		☐ 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), (l), 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(j))		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	02/05/2021	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 21	Minus	** 24	= 0	x \$100 =	0	
	Independent (37 CFR 1.16(h))	* 3	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	
AMENDMENT		(Column 1)		(Column 2)	(Column 3)			
		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".						/KAREN T WASHINGTON/		
*** 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.



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 NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/925,749	03/19/2018	Dieter Suess	SUSP02US2

143793
Gergely T. Zimanyi
11 Dartmouth Drive
Berkeley, CA 94705

CONFIRMATION NO. 8424
POA ACCEPTANCE LETTER



Date Mailed: 10/23/2020

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 10/21/2020.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/cvorachack/

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
15/925,749	03/19/2018

(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:

143793

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):

☒ 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

Date (Optional)

Name

Dr. Dieter Suess

Title

Applicant

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 1 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.

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of
Invention

MULTILAYER EXCHANGE SPRING RECORDING MEDIA

As the below named inventor, I hereby declare that:

This declaration
is directed to:

☐

The attached application, or

☒

United States application or PCT international application number 15/925,749

filed on 03/19/2018

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

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.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Dieter SUESS

Date (Optional):

16.8.2020

Signature:

Dieter S. Suss

Note: An application data sheet (PTO/AIA/14 or equivalent), including naming the entire inventive entity, must accompany this form. Use an additional PTO/SB/AIA01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1 minute 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 Acknowledgement Receipt	
EFS ID:	40899396
Application Number:	15925749
International Application Number:	
Confirmation Number:	8424
Title of Invention:	MULTILAYER EXCHANGE SPRING RECORDING MEDIA
First Named Inventor/Applicant Name:	Dieter Suess
Customer Number:	143793
Filer:	Gergely T. Zimanyi/Richard Pask
Filer Authorized By:	Gergely T. Zimanyi
Attorney Docket Number:	SUSP02US2
Receipt Date:	21-OCT-2020
Filing Date:	19-MAR-2018
Time Stamp:	01:35:37
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	1_SUSP02US2_Transmittal_Power_of_Attorney.pdf	443826 3f18b24a5683a803ebe5cf9b5383f498ec7332ec	no	1

Warnings:

Information:					
2	Power of Attorney	2_SUSP02US2_Power_of_Attorney.pdf	489134 abd5034a4b851bac945f09aec3fa8bea354dcb55	no	1
Warnings:					
Information:					
3	Oath or Declaration filed	3_SUSP02US2_Oath_Declaration.pdf	652994 2c82ff269f8b713cf7bbf1c1042d1242d70348aa	no	1
Warnings:					
Information:					
Total Files Size (in bytes):			1585954		
<p>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.</p> <p><u>New Applications Under 35 U.S.C. 111</u> 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.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> 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.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> 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.</p>					

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	15/925,749
Filing Date	03/19/2018
First Named Inventor	Dieter Suess
Title	MULTILAYER EXCHANGE SPRING RECORDING MEDIA
Art Unit	1785
Examiner Name	Lisa N. CHAU
Attorney Docket Number	SUSP02US2

SIGNATURE of Applicant or Patent Practitioner

Signature	/Gergely T. Zimanyi/	Date (Optional)	10/21/2020
Name	Gergely T. Zimanyi	Registration Number	45,754
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)	Dieter Suess		
<p>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.</p>			
☒ *Total of <u>1</u> 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.**

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Gergely T. Zimanyi
11 Dartmouth Drive
Berkeley, CA 94705



**Courtesy Reminder for
Application Serial No: 15/925,749**

Attorney Docket No: SUSP02US2
Customer Number: 143793
Date of Electronic Notification: 09/10/2020

This is a courtesy reminder that new correspondence is available for this application. If you have not done so already, please review the correspondence. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

An email notification regarding the correspondence was sent to the following email address(es) associated with your customer number:

gzimanyi@gmail.com
richepask@gmail.com

To view your correspondence online or update your email addresses, please visit us anytime at **<https://ppair-my.uspto.gov/pair/PrivatePair>**.
If you have any questions, please email the Electronic Business Center (EBC) at **EBC@uspto.gov** or call 1-866-217-9197.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/925,749	03/19/2018	Dieter Suess	SUSP02US2	8424
143793	7590	09/10/2020	EXAMINER	
Gergely T. Zimanyi 11 Dartmouth Drive Berkeley, CA 94705			CHAU, LISA N	
			ART UNIT	PAPER NUMBER
			1785	
			NOTIFICATION DATE	DELIVERY MODE
			09/10/2020	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):

gzimanyi@gmail.com
richepask@gmail.com

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Response to Amendment

2. Examiner acknowledges the amended Specification, cancelled Claims 3, 9, and 10, and amended Claim 4 in the response filed on 7/24/2020. It is also noted that Applicant withdrew Claims 13-24 mid-prosecution.

Terminal Disclaimer

3. The person who signed the terminal disclaimer has failed to state in what capacity it was signed on behalf of the juristic entity, and the person who signed it has not been established as being authorized to act on behalf of the juristic entity. Please see the Terminal Disclaimer review decision on 8/27/2020 for further details.

Information Disclosure Statement

4. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Double Patenting

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application

claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(I)(1) - 706.02(I)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

6. Claims 1, 2, 4-8, 11, and 12 are rejected on the ground of nonstatutory double patenting as being unpatentable over Claims 1-23 of U.S. Patent No. 9928864. Although the claims at

issue are not identical, they are not patentably distinct from each other because the subject matter sought is substantially covered by the subject matter in the US Patent.

7. Claims 1, 2, 4-8, 11, and 12 are provisionally rejected on the ground of nonstatutory double patenting as being unpatentable over Claims 1-26 of copending Application No. 15985661 in view of US Pub. No. 20070243418 ("Fullerton et al.").

The subject matter sought is substantially covered by the subject matter in copending Application No. 15985661.

Copending Application No. 15985661 does teach the claimed ferromagnetic layers with increasing anisotropy constant K from layer to layer.

However, Fullerton et al. further teaches that its nucleation host comprises ferromagnetic layers ([0022] and layers between MAG2 in RL1 to MAG2 in RL2 as shown in Fig. 6), wherein ferromagnetic layers have different anisotropy H_k from each other ([0022] and [0023]). While Fullerton et al. does not teach the claimed anisotropy in terms of anisotropy constant K , the Examiner deems that it would have been obvious to one of ordinary skill in the art that Fullerton et al. teaching of different H_k values from layer to layer will also have its ferromagnetic layers with increasing anisotropy constant K from layer to layer. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to have the copending Application No. 15985661's nucleation host comprise of ferromagnetic layers with increasing anisotropy constant K from layer to layer to produce a magnetic recording medium with improved writability and higher SNR (Abstract).

This is a provisional nonstatutory double patenting rejection.

8. Claims 1, 2, 4-8, 11, and 12 are rejected on the ground of nonstatutory double patenting as being unpatentable over Claims 1-45 of U.S. Patent No. 9978413 in view of US Pub. No. 20070243418 ("Fullerton et al.").

The subject matter sought is substantially covered by the subject matter in U.S. Patent No. 9978413.

U.S. Patent No. 9978413 does teach the claimed ferromagnetic layers with increasing anisotropy constant K from layer to layer.

However, Fullerton et al. further teaches that its nucleation host comprises ferromagnetic layers ([0022] and layers between MAG2 in RL1 to MAG2 in RL2 as shown in Fig. 6), wherein ferromagnetic layers have different anisotropy H_k from each other ([0022] and [0023]). While Fullerton et al. does not teach the claimed anisotropy in terms of anisotropy constant K, the Examiner deems that it would have been obvious to one of ordinary skill in the art that Fullerton et al. teaching of different H_k values from layer to layer will also have its ferromagnetic layers with increasing anisotropy constant K from layer to layer. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to have U.S. Patent No. 9978413's nucleation host comprise of ferromagnetic layers with increasing anisotropy constant K from layer to layer to produce a magnetic recording medium with improved writability and higher SNR (Abstract).

Conclusion

9. **THIS ACTION IS MADE FINAL.** 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 mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LISA CHAU whose telephone number is (571)270-5496. The examiner can normally be reached on Monday-Friday 11 AM-730 PM.

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, Mark Ruthkosky can be reached on (571) 272-1291. 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.

/LC/
Lisa Chau
Art Unit 1785

/HOLLY C RICKMAN/
Primary Examiner, Art Unit 1785

<i>Search Notes</i> 	Application/Control No. 15/925,749	Applicant(s)/Patent Under Reexamination Suess, Dieter
	Examiner LISA CHAU	Art Unit 1785

CPC - Searched*		
Symbol	Date	Examiner
G11B 5/+	10/25/2019	LC
G11B 2005/0029, 3996	10/25/2019	LC
G11B 20/10, 1217	10/25/2019	LC
G11B 2020/10898, 1281	10/25/2019	LC
G11B 2220/235, 2516	10/25/2019	LC
H01F 10/3295, 30, 12, 3218, 324	10/25/2019	LC
H01F 41/0206, 18, 30, 302, 303, 305, 32	10/25/2019	LC

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner
428	800+		

* 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
Inventor	10/25/2019	LC
Prosecution histories on App. No. 11424859 and 12619849	10/25/2019	LC
All classification searched with TEXT	10/25/2019	LC
Update	09/01/2020	LC

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<i>Search Notes</i> 	Application/Control No. 15/925,749	Applicant(s)/Patent Under Reexamination Suess, Dieter
	Examiner LISA CHAU	Art Unit 1785

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

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<i>Index of Claims</i> 	Application/Control No. 15/925,749	Applicant(s)/Patent Under Reexamination Suess, Dieter
	Examiner LISA CHAU	Art Unit 1785

✓	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	10/25/2019	09/01/2020						
	1	✓	✓						
	2	✓	✓						
	3	✓	-						
	4	✓	✓						
	5	✓	✓						
	6	✓	✓						
	7	✓	✓						
	8	✓	✓						
	9	✓	-						
	10	✓	-						
	11	✓	✓						
	12	✓	✓						
	13	✓	N						
	14	✓	N						
	15	✓	N						
	16	✓	N						
	17	✓	N						
	18	✓	N						
	19	✓	N						
	20	✓	N						
	21	✓	N						
	22	✓	N						
	23	✓	N						
	24	✓	N						

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	2	((DIETER) near2 (SUESS)).INV.	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 10:22
S2	1	((DIETER) near2 (SUESS)).INV.	EPO; JPO; DERWENT	ADJ	ON	2011/01/07 10:23
S3	10	((("5583727") or ("6280813") or ("6383668") or ("6468670") or ("20070292720")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2011/01/07 10:24
S4	25	("5569533" "5815342" "6294490").PN. OR ("6383668").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:18
S5	826	(428/827,828,828.1,829).ccls.	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:31
S6	604	S5 and anisotropy	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:31
S7	12	S5 and anisotropy and host	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:32
S8	1	"20100165508"	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:37
S9	46	vary\$6 anisotropy	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:40
S10	2	S9 and "428"/	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:40
S11	4,988	(varies\$5 or vary\$6) same anisotropy	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:52
S12	483	S11 and "428"/	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:52
S13	1,651	(varies\$5 or vary\$6) near12 anisotropy	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:53

S14	1,752	(varies\$5 or vary\$6) near15 anisotropy	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:53
S15	167	S14 and "428"/	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:53
S16	115	S14 and recording.ab.	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:54
S17	4	"20030180577" or "20060228586" or "20060222901"	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/11 14:20
S19	3	"20060177700"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 11:17
S20	3	"20060177704"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 11:19
S21	2	"20050058855"	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/12 16:06
S22	12	"18" and (anti\$1ferro\$1magnet\$5 coupl\$5) and (diameter same grain same height)	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/12 16:07
S23	12	"18" and (anti\$1ferro\$1magnet\$5 coupl\$5) and (diameter same grain same height)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:07
S24	3,445	"18" and (diameter same grain same height)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:08
S25	37	"18" and (diameter same grain same height) and (perpendicular.ab.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:08

S26	828	(428/827,828,828.1,829).ccls.	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/12 16:10
S27	5	S26 and (diameter same grain same height) and (perpendicular.ab.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:10
S28	2	S26 and (anti\$1ferro\$1magnet\$5 coupl\$5) and (diameter same grain same height)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:12
S29	29	S26 and (height same diameter)	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/12 16:13
S30	29	S26 and (height same diameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:13
S31	67	(perpendicular near3 recording).ab. and (height same diameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:30
S32	119	(perpendicular near3 recording).ab. and (thickness same (granular or grain) same diameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:35
S33	15	(perpendicular near3 recording).ab. and (height same (granular or grain) same diameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:38
S34	74	(magnetic recording medium).ab. and (height same (granular or grain) same diameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:38

S35	5	(magnetic recording medium).ab. and (height same (granular or grain) same average diameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:42
S36	116	(magnetic recording medium).ab. and ((granular or grain) same average diameter)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:43
S37	1,851	(varies\$5 or vary\$6) near15 anisotropy	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/07/12 13:38
S38	859	(428/827,828,828.1,829).ccls.	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/07/12 13:38
S39	20	S37 and S38	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/07/12 13:38
S40	42	428/8\$.ccls. and (grad\$5 near2 anisotrop\$5)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2013/11/01 14:29
S41	3	"20060222901"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2013/11/01 14:32
S42	34	lisa near3 chau	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2013/11/01 17:19
S43	5	"20040057156" or "20040053078"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2013/11/01 17:34
S44	2	"20040013910"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2013/11/01 17:47
S45	8	"6759149"	US-PGPUB; USPAT;	ADJ	OFF	2013/11/01 17:50

			USOCR; EPO; JPO; DERWENT			
S46	3	"20060177704"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2013/11/01 17:50
S47	14	"20040086753" or "20040013910" or "6610424"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2013/11/01 17:57
S48	47	428/8\$.ccls. and (grad\$5 near2 anisotrop\$5)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2014/08/22 14:55
S49	1,117	(428/827,828,828.1,829).ccls.	US-PGPUB; USPAT; USOCR	ADJ	ON	2014/12/28 15:58
S50	1,027	S49 AND (G11B5/66 OR G11B5/65 OR G11B5/7325 OR G11B5/667 OR G11B5/82 OR G11B5/855 OR G11B5/84 OR G11B5/746 OR G11B5/656 OR G11B5/732 OR G11B5/8404 OR G11B5/72 OR G11B5/64 OR G11B5/653 OR G11B5/851 OR G11B5/1278 OR G11B5/738 OR G11B5/743 OR G11B2005/0021 OR G11B2005/0024 OR G11B2005/0029 OR G11B5/3906 OR G11B5/3909 OR G11B2020/1281 OR G11B20/10 OR G11B20/1217 OR G11B2220/235 OR G11B2220/2516 OR G11B5/1276 OR G11B5/235 OR G11B5/3113 OR G11B5/314 OR G11B5/3146 OR G11B5/3153 OR G11B5/3163 OR G11B5/3929 OR G11B5/3983 OR G11B5/6088 OR G11B5/645 OR G11B5/647 OR G11B5/70605 OR G11B5/70626 OR G11B5/708 OR G11B5/716 OR G11B5/7315 OR G11B5/735 OR G11B5/85 OR G11B5/865).CPC.)	US-PGPUB; USPAT; USOCR	ADJ	ON	2014/12/28 15:58
S51	26	S50 and (grad\$5 near2 anisotrop\$5)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2014/12/28 15:58

S52	32	(428/827,828,828.1,829).ccls. and (grad\$5 near2 anisotrop\$5)	US-PGPUB; USPAT; USOCR	ADJ	ON	2015/06/24 17:23
S53	2	Jp "03254421"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2016/02/23 16:46
S54	33	(428/827,828,828.1,829).ccls. and (grad\$5 near2 anisotrop\$5)	US-PGPUB; USPAT; USOCR	ADJ	ON	2016/02/23 18:20
S55	56	chau near3 lisa	US-PGPUB; USPAT; USOCR	ADJ	ON	2016/08/29 16:26
S56	4	"20010051287"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2016/08/29 19:25
S57	8	"20050058855"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2016/08/29 19:39
S58	1,161	(428/827,828,828.1,829).ccls.	US-PGPUB; USPAT; USOCR	ADJ	ON	2017/06/11 17:15
S59	1,070	S58 AND (G11B5/66 OR G11B5/65 OR G11B5/7325 OR G11B5/667 OR G11B5/82 OR G11B5/855 OR G11B5/84 OR G11B5/746 OR G11B5/656 OR G11B5/732 OR G11B5/8404 OR G11B5/72 OR G11B5/64 OR G11B5/653 OR G11B5/851 OR G11B5/1278 OR G11B5/738 OR G11B5/743 OR G11B2005/0021 OR G11B2005/0024 OR G11B2005/0029 OR G11B5/3906 OR G11B5/3909 OR G11B2020/1281 OR G11B20/10 OR G11B20/1217 OR G11B2220/235 OR G11B2220/2516 OR G11B5/1276 OR G11B5/235 OR G11B5/3113 OR G11B5/314 OR G11B5/3146 OR G11B5/3153 OR G11B5/3163 OR G11B5/3929 OR G11B5/3983 OR G11B5/6088 OR G11B5/645 OR G11B5/647 OR G11B5/70605 OR G11B5/70626 OR G11B5/708 OR	US-PGPUB; USPAT; USOCR	ADJ	ON	2017/06/11 17:15

		G11B5/716 OR G11B5/7315 OR G11B5/735 OR G11B5/85 OR G11B5/865).CPC.)				
S60	34	S59 and (grad\$5 near2 anisotrop\$5)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2017/06/11 17:15
S68	23	((("20010051287") or ("20040053078") or ("20040057156") or ("20070292720") or ("5583727") or ("6280813") or ("6383668") or ("6468670") or ("7550210"))).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2017/12/04 12:42
S69	80	lisa near2 chau	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2019/10/09 11:39
S70	1	"20180211689"	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:00
S71	2,303	((G11B5/64 OR G11B5/66).CPC.)	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:01
S72	1,161	(428/827,828,828.1,829).ccls.	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:01
S73	1,110	S72 AND ((G11B5/66 OR G11B5/65 OR G11B5/7325 OR G11B5/667 OR G11B5/82 OR G11B5/656 OR G11B5/84 OR G11B5/855 OR G11B5/7379 OR G11B5/746 OR G11B5/851 OR G11B2005/0021 OR G11B2005/0024 OR G11B5/64 OR G11B5/653 OR G11B5/73 OR G11B5/1278 OR G11B5/8404 OR G11B5/314 OR G11B5/743 OR G11B5/3909 OR G11B5/72 OR G11B5/7315 OR G11B2005/0029 OR G11B2005/3996 OR G11B20/10 OR G11B5/1276 OR G11B5/85 OR G11B2020/10898 OR G11B2020/1281 OR G11B20/1217 OR G11B2220/235 OR G11B2220/2516 OR G11B5/127 OR G11B5/1272 OR G11B5/235 OR G11B5/3113 OR G11B5/3133 OR G11B5/3146 OR G11B5/3153 OR G11B5/3163 OR G11B5/3906 OR G11B5/3912 OR G11B5/3929 OR	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:01

		G11B5/6088 OR G11B5/645 OR G11B5/647 OR G11B5/706 OR G11B5/70605 OR G11B5/708 OR G11B5/716 OR G11B5/735 OR G11B5/865 OR H01F10/3286 OR H01F10/123 OR H01F10/3254 OR H01F10/3272 OR H01F10/329 OR H01F10/3295 OR H01F10/30 OR H01F41/0206 OR H01F10/12 OR H01F10/3218 OR H01F10/324 OR H01F41/18 OR H01F41/30 OR H01F41/302 OR H01F41/303 OR H01F41/305 OR H01F41/32 OR Y10T428/115 OR Y10T29/4902 OR Y10T29/49032 OR Y10T29/49067 OR Y10T428/12458 OR Y10T428/12465 OR Y10T428/12931 OR Y10T428/26 OR Y10T428/265 OR Y10T156/10 OR Y10T29/49021 OR Y10T29/49043 OR Y10T29/49044 OR Y10T29/49048 OR Y10T29/49052 OR Y10T428/11 OR Y10T428/1107 OR Y10T428/1114 OR Y10T428/1121 OR Y10T428/1143 OR Y10T428/24273 OR Y10T428/315 OR Y10T83/04).CPC.)				
S74	96,979	(G11B5/66 OR G11B5/65 OR G11B5/7325 OR G11B5/667 OR G11B5/82 OR G11B5/656 OR G11B5/84 OR G11B5/855 OR G11B5/7379 OR G11B5/746 OR G11B5/851 OR G11B2005/0021 OR G11B2005/0024 OR G11B5/64 OR G11B5/653 OR G11B5/73 OR G11B5/1278 OR G11B5/8404 OR G11B5/314 OR G11B5/743 OR G11B5/3909 OR G11B5/72 OR G11B5/7315 OR G11B2005/0029 OR G11B2005/3996 OR G11B20/10 OR G11B5/1276 OR G11B5/85 OR G11B2020/10898 OR G11B2020/1281 OR G11B20/1217 OR G11B2220/235 OR G11B2220/2516 OR G11B5/127 OR G11B5/1272 OR G11B5/235 OR G11B5/3113 OR G11B5/3133 OR G11B5/3146 OR G11B5/3153 OR G11B5/3163 OR G11B5/3906 OR G11B5/3912 OR G11B5/3929 OR G11B5/6088 OR G11B5/645 OR G11B5/647 OR G11B5/706 OR G11B5/70605 OR G11B5/708 OR G11B5/716 OR G11B5/735 OR G11B5/865 OR H01F10/3286 OR H01F10/123 OR H01F10/3254 OR H01F10/3272 OR H01F10/329 OR H01F10/3295 OR	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:01

		H01F10/30 OR H01F41/0206 OR H01F10/12 OR H01F10/3218 OR H01F10/324 OR H01F41/18 OR H01F41/30 OR H01F41/302 OR H01F41/303 OR H01F41/305 OR H01F41/32 OR Y10T428/115 OR Y10T29/4902 OR Y10T29/49032 OR Y10T29/49067 OR Y10T428/12458 OR Y10T428/12465 OR Y10T428/12931 OR Y10T428/26 OR Y10T428/265 OR Y10T156/10 OR Y10T29/49021 OR Y10T29/49043 OR Y10T29/49044 OR Y10T29/49048 OR Y10T29/49052 OR Y10T428/11 OR Y10T428/1107 OR Y10T428/1114 OR Y10T428/1121 OR Y10T428/1143 OR Y10T428/24273 OR Y10T428/315 OR Y10T83/04).CPC.)				
S75	9	S73 and ((varies\$5 or vary\$6 or gradient\$5 or gradual\$5 or variat\$5) near15 (anisotrop\$5 near3 ("k" or constant\$5)))	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:02
S76	57	S74 and ((varies\$5 or vary\$6 or gradient\$5 or gradual\$5 or variat\$5) near15 (anisotrop\$5 near3 ("k" or constant\$5)))	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:02
S77	153	S74 and (exchange\$5 near3 spring\$5)	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:11
S78	12	((("SUESS") near3 ("Dieter"))).INV.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	ON	2019/10/24 15:36
S79	114	(428/827,828,828.1,829).ccls. and ("l10" or l1o or "l1.sub.o" or "l1.sub.0" or "l.sub.10" or "l.sub.1o")	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/25 15:10
S80	406	(428/8\$).ccls. and ("l10" or l1o or "l1.sub.o" or "l1.sub.0" or "l.sub.10" or "l.sub.1o")	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/25 15:24
S81	2	"20070026262"	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/25 15:32
S82	18	("2007/0026262").URPN.	USPAT	ADJ	ON	2019/10/25 15:33
S83	98,570	((G11B5/66 OR G11B5/65 OR G11B5/7325 OR G11B5/667 OR G11B5/82 OR G11B5/656 OR G11B5/84 OR G11B5/855 OR G11B5/7379 OR G11B5/746 OR G11B5/851 OR	US-PGPUB; USPAT; USOCR	ADJ	ON	2020/09/01 12:33

		G11B2005/0021 OR G11B2005/0024 OR G11B5/64 OR G11B5/653 OR G11B5/73 OR G11B5/1278 OR G11B5/8404 OR G11B5/314 OR G11B5/743 OR G11B5/3909 OR G11B5/72 OR G11B5/7315 OR G11B2005/0029 OR G11B2005/3996 OR G11B20/10 OR G11B5/1276 OR G11B5/85 OR G11B2020/10898 OR G11B2020/1281 OR G11B20/1217 OR G11B2220/235 OR G11B2220/2516 OR G11B5/127 OR G11B5/1272 OR G11B5/235 OR G11B5/3113 OR G11B5/3133 OR G11B5/3146 OR G11B5/3153 OR G11B5/3163 OR G11B5/3906 OR G11B5/3912 OR G11B5/3929 OR G11B5/6088 OR G11B5/645 OR G11B5/647 OR G11B5/706 OR G11B5/70605 OR G11B5/708 OR G11B5/716 OR G11B5/735 OR G11B5/865 OR H01F10/3286 OR H01F10/123 OR H01F10/3254 OR H01F10/3272 OR H01F10/329 OR H01F10/3295 OR H01F10/30 OR H01F41/0206 OR H01F10/12 OR H01F10/3218 OR H01F10/324 OR H01F41/18 OR H01F41/30 OR H01F41/302 OR H01F41/303 OR H01F41/305 OR H01F41/32 OR Y10T428/115 OR Y10T29/4902 OR Y10T29/49032 OR Y10T29/49067 OR Y10T428/12458 OR Y10T428/12465 OR Y10T428/12931 OR Y10T428/26 OR Y10T428/265 OR Y10T156/10 OR Y10T29/49021 OR Y10T29/49043 OR Y10T29/49044 OR Y10T29/49048 OR Y10T29/49052 OR Y10T428/11 OR Y10T428/1107 OR Y10T428/1114 OR Y10T428/1121 OR Y10T428/1143 OR Y10T428/24273 OR Y10T428/315 OR Y10T83/04).CPC.)				
S84	58	S83 and ((varies\$5 or vary\$6 or gradient\$5 or gradual\$5 or variat\$5) near15 (anisotrop\$5 near3 ("k" or constant\$5)))	US-PGPUB; USPAT; USOCR	ADJ	ON	2020/09/01 12:33

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
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S61	4,074	(coercivity or (coerciv\$4 near\$5 (field for force)) or hc\$3 or "h.sub.c"\$5) same (magnet\$5 or ferro\$5magnet\$5).clm.	US-PGPUB; USPAT	ADJ	ON	2017/10/02 15:34
S62	11,352	((gradient or gradual\$5 or increas\$5 or decreas\$5) same (anisotrop\$5 or anisotrop\$5 near\$5 constant\$5 or ku or ku\$2 or "ku.sub."\$2 or k!)).clm.	US-PGPUB; USPAT	ADJ	ON	2017/10/02 15:37
S63	39	S61 and S62	US-PGPUB; USPAT	ADJ	ON	2017/10/02 15:37
S64	81	grad\$4 near\$3 anisotrop\$5.clm.	US-PGPUB; USPAT	ADJ	ON	2017/10/02 15:53
S65	38	S64 and (magnet\$5 or ferro\$5magnet\$5).clm.	US-PGPUB; USPAT	ADJ	ON	2017/10/02 15:54
S66	418	exchange\$5 near\$4 spring.clm.	US-PGPUB; USPAT	ADJ	ON	2017/10/02 15:55
S67	10	S61 and S66	US-PGPUB; USPAT	ADJ	ON	2017/10/02 15:56

9/1/2020 12:37:34 PM

C:\Users\lchau5\Documents\EAST\Workspaces\12619849\12619849.wsp

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Gergely T. Zimanyi
11 Dartmouth Drive
Berkeley, CA 94705



**Courtesy Reminder for
Application Serial No: 15/925,749**

Attorney Docket No: SUSP02US2

Customer Number: 143793

Date of Electronic Notification: 08/26/2020

This is a courtesy reminder that new correspondence is available for this application. If you have not done so already, please review the correspondence. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

An email notification regarding the correspondence was sent to the following email address(es) associated with your customer number:

gzimanyi@gmail.com

richepask@gmail.com

To view your correspondence online or update your email addresses, please visit us anytime at **<https://ppair-my.uspto.gov/pair/PrivatePair>**.

If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov or call 1-866-217-9197.

Application Number * 15/925,749 *	Application/Control No. 15/925,749	Applicant(s)/Patent under Reexamination Suess, Dieter	
	Examiner CHAU, LISA N	Art Unit 1785	
Document Code - DISQ		Internal Document - DO NOT MAIL	

TERMINAL DISCLAIMER	☐ APPROVED	☒ DISAPPROVED
Date Filed: <u>24 July 2020</u>	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by: /JEAN PROCTOR/ Technology Center: <u>OPLC</u> Telephone: <u>(571)272-1040</u> <u>37 CFR 1.321 (a) and (b). (See FP 14.26.08)</u> <u>is not the applicant, patentee or an attorney or agent of record. (See FP 14.26.09).</u> <u>failed to state his/her capacity to sign for the juristic entity, and he/she has not been established as being</u> <u>authorized to act</u> <u>on behalf of the applicant. (See FP 14.26.09).</u> <u>(Note: PoA can be given to a customer number, wherein all practitioners listed under the customer number</u> <u>have PoA.</u> <u>given to a list of practitioners by registration number, the list may not comprise more than 10 practitioners or</u> <u>a separate paper</u> <u>signed by a 37 CFR 1.33(b) party must be in the record identifying which of the practitioners, up to 10, are</u> <u>recognized as having</u> <u>PoA. If the applicant is a juristic entity (e.g., corporation), a representative of the applicant cannot sign the TD</u> <u>unless it is</u> <u>established that the representative is a party authorized to act on behalf of the applicant.)</u>
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/925,749	03/19/2018	Dieter Suess	SUSP02US2	8424
143793	7590	08/25/2020	EXAMINER	
Gergely T. Zimanyi 11 Dartmouth Drive Berkeley, CA 94705			CHAU, LISA N	
			ART UNIT	PAPER NUMBER
			1785	
			NOTIFICATION DATE	DELIVERY MODE
			08/25/2020	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):

gzimanyi@gmail.com
richepask@gmail.com



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
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Alexandria, VA 22313-1450
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In re Application of :
Suess, Dieter :
Application No. 15/925,749 : **DECISION ON PETITION**
Filed: March 19, 2018 :
For: MULTILAYER EXCHANGE SPRING :
RECORDING MEDIA :

This is a decision in response to the petition, filed August 15, 2020 under the provisions 37 CFR 1.182 to expedite consideration of a petition filed July 24, 2020, to revive the above-identified application under the provisions of 37 CFR 1.137(a).

There is no indication that the petition is signed by a registered patent attorney or patent agent of record. However, in accordance with 37 CFR 1.34, the signature of Mr. Gergely T. Zimanyi appearing on the correspondence shall constitute a representation to the United States Patent and Trademark Office that he is authorized to represent the particular party on whose behalf he acts.

The petition under 37 CFR 1.182 is **GRANTED**.

The petition for expedited consideration includes payment of the petition fee under 1.182. The relief requested is warranted. Accordingly, the petition under 37 CFR 1.137(a) is being considered out of turn.

The petition under 37 CFR 1.137(a) is **GRANTED**.

This application became abandoned for a failure to respond timely to the non-final Office action, mailed November 4, 2019, which set a shortened statutory period for reply of three (3) months. No extensions of time under the provisions of 37 CFR 1.136(a) were filed. Accordingly, the date of abandonment of this application is February 5, 2020. A Notice of Abandonment was mailed on June 24, 2020.

The petition satisfies the requirements of 37 CFR 1.137(a) in that petitioner has supplied (1) the reply in the form of an amendment, (2) the petition fee of \$1000; and (3) a proper statement of unintentional delay.

The application is being forwarded to the Technology Center Art Unit 1785 for appropriate action in the normal course of business on the reply received July 24, 2020.

Telephone inquiries concerning this decision should be directed to the undersigned at (571) 272-1058. All other inquiries regarding this application should be directed to the Technology Center.

/Angela Walker/
Angela Walker
Paralegal Specialist
Office of Petitions

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 15/925,749		Filing Date 03/19/2018		☐ 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), (l), 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 \$50 =							
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 = *				x \$230 =							
☐ 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		08/24/2020	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)				
		Total (37 CFR 1.16(i))	* 21	Minus	** 24	= 0	x \$50 =		0				
		Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0	x \$230 =		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					
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".						/GOIGA N DUCKETT/							
*** 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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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor:	Dieter SUESS	Examiner:	Lisa N. CHAU
Application No.:	15/925,749	Art Unit:	1785
Filing Date:	03/19/2018	Confirmation No.:	8424
		Docket No.:	SUSP02US2
		Customer No.:	143793
		Date:	08/15/2020

Title: **MULTILAYER EXCHANGE SPRING RECORDING MEDIA**

Mail Stop Petitions

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

PETITION TO EXPEDITE UNDER 37 C.F.R. § 1.182

Applicant requests expedited handling of the Petition for Revival of an Application for Patent Abandonment Unintentionally Under 37 CFR 1.137(a) which was filed 07/24/2020. The fee under 37 CFR § 1.17(f) of \$200 for expedited handling of this petition is being paid concurrently herewith via EFS-Web.

Respectfully submitted,

Date: 08/15/2020

/Gergely T. Zimanyi/
Gergely T. Zimanyi, Ph.D.
Registration No. 45,754

CERTIFICATE OF TRANSMISSION UNDER 37 CFR 1.8
I hereby certify that this correspondence is being transmitted to the USPTO via EFS-Web on 08/15/2020.

<u>/Richard A. Pask/</u>	<u>08/15/2020</u>
Richard A. Pask	Date

Gergely T. Zimanyi
11 Dartmouth Drive
Berkeley, CA 94745
Telephone: 530-400-3936
Email: gzimanyi@gmail.com

Electronic Patent Application Fee Transmittal				
Application Number:		15925749		
Filing Date:		19-Mar-2018		
Title of Invention:		MULTILAYER EXCHANGE SPRING RECORDING MEDIA		
First Named Inventor/Applicant Name:		Dieter Suess		
Filer:		Gergely T. Zimanyi/Richard Pask		
Attorney Docket Number:		SUSP02US2		
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
PETITION FEE - 37 CFR 1.17(F)(GROUP I)	2462	1	200	200
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				200

Electronic Acknowledgement Receipt	
EFS ID:	40295428
Application Number:	15925749
International Application Number:	
Confirmation Number:	8424
Title of Invention:	MULTILAYER EXCHANGE SPRING RECORDING MEDIA
First Named Inventor/Applicant Name:	Dieter Suess
Customer Number:	143793
Filer:	Gergely T. Zimanyi/Richard Pask
Filer Authorized By:	Gergely T. Zimanyi
Attorney Docket Number:	SUSP02US2
Receipt Date:	15-AUG-2020
Filing Date:	19-MAR-2018
Time Stamp:	19:42:12
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 200
RAM confirmation Number	E20208EJ44017733
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	Petition for review by the Office of Petitions	1_SUSP02US2_Petition_to_Exp edite_1_182.pdf	336905	no	1
			c66d2b829fe51b559d255f5c959cc4f48bef af6f		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30568	no	2
			aaf8dd2e1858ae34da63c6c57f1bd8b3a5d 5711e		
Warnings:					
Information:					
Total Files Size (in bytes):			367473		
<p>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.</p> <p><u>New Applications Under 35 U.S.C. 111</u> 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.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> 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.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> 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.</p>					

Electronic Patent Application Fee Transmittal				
Application Number:		15925749		
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Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
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Claims:				
Miscellaneous-Filing:				
Petition:				
PET. REVIVE ABANDON APP, DELAY PYMT-RESP	2453	1	1000	1000
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
STATUTORY OR TERMINAL DISCLAIMER	2814	3	160	480
Total in USD (\$)				1480

Electronic Acknowledgement Receipt	
EFS ID:	40093314
Application Number:	15925749
International Application Number:	
Confirmation Number:	8424
Title of Invention:	MULTILAYER EXCHANGE SPRING RECORDING MEDIA
First Named Inventor/Applicant Name:	Dieter Suess
Customer Number:	143793
Filer:	Gergely T. Zimanyi/Richard Pask
Filer Authorized By:	Gergely T. Zimanyi
Attorney Docket Number:	SUSP02US2
Receipt Date:	24-JUL-2020
Filing Date:	19-MAR-2018
Time Stamp:	03:38:17
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 1480
RAM confirmation Number	E20207N440184077
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	Petition for review by the Office of Petitions	1_SUSP02US2_Petition_for_Revival_Unintentional_Abandonment.pdf	2238110	no	4
			81c1f187622acc32e6290d4e7aec17ca49c15616		
Warnings:					
Information:					
2		2_SUSP02US2_Response_to_Office_Action.pdf	8148766	yes	15
			06529bd33363e4d3f827e752ab4ee0261d793c13		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Amendment/Req. Reconsideration-After Non-Final Reject		1	1	
	Specification		2	5	
	Claims		6	10	
	Applicant Arguments/Remarks Made in an Amendment		11	15	
Warnings:					
Information:					
3	Terminal Disclaimer Filed	3_SUSP02US2_Terminal_Disclaimers.pdf	1255541	no	3
			8a671d939debb2bd27ac3a38770b1cd51472b2e4		
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	32425	no	2
			10c741fabf38895994cf25211a98f782a74cd3d		
Warnings:					
Information:					
Total Files Size (in bytes):			11674842		

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.

**TERMINAL DISCLAIMER TO OBTAIN A DOUBLE PATENTING
REJECTION OVER A "PRIOR" PATENT**

Docket Number (Optional)
SUSP02US2

In re Application of: Dieter SUESS

Application No.: 15/925,749

Filed: 03/19/2018

For: MULTILAYER EXCHANGE SPRING RECORDING MEDIA

The applicant, Dieter Sues, owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 9,928,864 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

- expires for failure to pay a maintenance fee;
- is held unenforceable;
- is found invalid by a court of competent jurisdiction;
- is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
- has all claims canceled by a reexamination certificate;
- is reissued; or
- is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 45,754

/Gergely T. Zimanyi/
Signature

07/24/2020
Date

Gergely T. Zimanyi
Typed or printed name

Title

530-400-3936
Telephone Number

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

This collection of information is required by 37 CFR 1.321. 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. 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.

**TERMINAL DISCLAIMER TO OBVIATE A PROVISIONAL DOUBLE PATENTING
REJECTION OVER A PENDING "REFERENCE" APPLICATION**

Docket Number (Optional)

SUSP02US2

In re Application of: Dieter Suess

Application No.: 15/925,749

Filed: 03/19/2018

For: MULTILAYER EXCHANGE SPRING RECORDING MEDIA

The applicant, Dieter Suess, owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of any patent granted on pending reference Application Number 15/985,661, filed 05/21/2018, as the term of any patent granted on said reference application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending reference application. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and any patent granted on the reference application are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term of any patent granted on said reference application, "as the term of any patent granted on said reference application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending reference application," in the event that: any such patent granted on the pending reference application expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as shortened by any terminal disclaimer filed prior to its grant.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 45,754

/Gergely T. Zimanyi/

Signature

07/24/2020

Date

Gergely T. Zimanyi

Typed or printed name

Title530-400-3936

Telephone Number

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) is included.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

This collection of information is required by 37 CFR 1.321. 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. 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.

TERMINAL DISCLAIMER TO OBTAIN A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	Docket Number (Optional) SUSP02US2
<p>In re Application of: Dieter SUESS</p> <p>Application No.: 15/925,749</p> <p>Filed: 03/19/2018</p> <p>For: MULTILAYER EXCHANGE SPRING RECORDING MEDIA</p> <p>The applicant, <u>Dieter Sues</u>, owner of <u>100</u> percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent No. <u>9,978,413</u> as the term of said prior patent is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.</p> <p>In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the prior patent, "as the term of said prior patent is presently shortened by any terminal disclaimer," in the event that said prior patent later:</p> <ul style="list-style-type: none">expires for failure to pay a maintenance fee;is held unenforceable;is found invalid by a court of competent jurisdiction;is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;has all claims canceled by a reexamination certificate;is reissued; oris in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer. <p>Check either box 1 or 2 below, if appropriate.</p> <p>1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.</p> <p>I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.</p> <p>2. ☒ The undersigned is an attorney or agent of record. Reg. No. <u>45,754</u></p> <div style="display: flex; justify-content: space-between; margin-top: 20px;"><div style="width: 60%; text-align: center;"><u>/Gergely T. Zimanyi/</u> Signature</div><div style="width: 30%; text-align: center;"><u>07/24/2020</u> Date</div></div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"><div style="width: 60%; text-align: center;"><u>Gergely T. Zimanyi</u> Typed or printed name</div><div style="width: 30%;"></div></div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"><div style="width: 60%; text-align: center;"><u></u> Title</div><div style="width: 30%; text-align: center;"><u>530-400-3936</u> Telephone Number</div></div> <p>☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.</p> <p style="text-align: center;">WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.</p>	

This collection of information is required by 37 CFR 1.321. 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. 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: PET.OP

Document Description: Petition for Review by the Office of Petitions

PTO/SB/64 (01-18)

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 displays a valid OMB control number.

PETITION FOR REVIVAL OF AN APPLICATION FOR PATENT ABANDONED UNINTENTIONALLY UNDER 37 CFR 1.137(a) Page 1 of 2	Docket Number (Optional) SUSP02US2
<p>First named inventor: <u>Dieter SUESS</u></p> <p>Application No.: <u>15/925,749</u> Art Unit: <u>1785</u></p> <p>Filed: <u>03/19/2018</u> Examiner: <u>Lisa N. CHAU</u></p> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;">Title: MULTILAYER EXCHANGE SPRING RECORDING MEDIA</div> <p>Attention: Office of Petitions Mail Stop Petition Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450 FAX (571) 273-8300</p> <p>NOTE: If information or assistance is needed in completing this form, please contact the Office of Petitions at (571) 272-3282.</p> <p>The above-identified application became abandoned for failure to file a timely and proper reply to a notice or action by the United States Patent and Trademark Office. The date of abandonment is the day after the expiration date of the period set for reply in the Office notice or action plus any extensions of time actually obtained.</p> <p style="text-align: center;">APPLICANT HEREBY PETITIONS FOR REVIVAL OF THIS APPLICATION.</p> <p>NOTE: A grantable petition requires the following items:</p> <ul style="list-style-type: none">(1) Petition fee;(2) Reply and/or issue fee;(3) Terminal disclaimer with disclaimer fee – required for all utility and plant applications filed before June 8, 1995, and for all design applications; and(4) Statement that the entire delay was unintentional. <p>1. Petition fee</p> <p>☒ Small entity fee \$ <u>1,000</u> (37 CFR 1.17(m)). Applicant asserts small entity status. See 37 CFR 1.27.</p> <p>☐ Micro entity fee \$ _____ (37 CFR 1.17(m)). Applicant certifies micro entity status. See 37 CFR 1.29. Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.</p> <p>☐ Undiscounted fee \$ _____ (37 CFR 1.17(m)).</p> <p>2. Reply and/or fee</p> <p>A The reply and/or fee to the above-noted Office notice or action in the form of</p> <p style="padding-left: 40px;"><u>Response to Office Action</u> (identify the type of reply):</p> <p style="padding-left: 40px;">☐ has been filed previously on _____.</p> <p style="padding-left: 40px;">☒ is enclosed herewith.</p> <p>B The issue fee and publication fee (if applicable) of \$ _____</p> <p style="padding-left: 40px;">☐ has been paid previously on _____.</p> <p style="padding-left: 40px;">☐ is enclosed herewith.</p>	

This collection of information is required by 37 CFR 1.137(b). 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, 1.14 and 41.6. 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: Mail Stop Petition, 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: PET.OP

Document Description: Petition for Review by the Office of Petitions

PTO/SB/64 (01-18)

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 displays a valid OMB control number.

**PETITION FOR REVIVAL OF AN APPLICATION FOR PATENT
ABANDONED UNINTENTIONALLY UNDER 37 CFR 1.137(a)**

Page 2 of 2

3. Terminal disclaimer with disclaimer fee

☒

Since this utility/plant application was filed on or after June 8, 1995, no terminal disclaimer is required.

☐

A terminal disclaimer (and disclaimer fee (37 CFR 1.20(d)) of \$ _____) disclaiming the required period of time is enclosed herewith (see PTO/SB/63).

4. STATEMENT: The entire delay in filing the required reply from the due date for the required reply until the filing of a grantable petition under 37 CFR 1.137(a) was unintentional. [NOTE: The United States Patent and Trademark Office may require additional information if there is a question as to whether either the abandonment or the delay in filing a petition under 37 CFR 1.137(a) was unintentional (MPEP 711.03(c), subsections (III)(C) and (D)).]

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

/Gergely T. Zimanyi/

Signature

07/24/2020

Date

Gergely T. Zimanyi

Typed or Printed Name

45,754

Registration Number, if applicable

11 Dartmouth Drive

Address

530-400-3936

Telephone Number

Berkeley, California 94705

Address

Enclosures:

☒

Fee Payment

☒

Reply

☐

Terminal Disclaimer Form

☒

Additional sheet(s) containing statements establishing unintentional delay

☐

Other: _____

CERTIFICATE OF MAILING OR TRANSMISSION [37 CFR 1.8(a)]

I hereby certify that this correspondence is being:

☐

Deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Mail Stop Petition, Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450.

☐

Transmitted by facsimile on the date shown below to the United States Patent and Trademark Office at (571) 273-8300.

07/24/2020

Date

/Richard A. Pask/

Signature

Richard A. Pask - Transmitted by EFS

Typed or printed name of person signing certificate

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Dieter SUESS
Application No.: 15/925,749
Filing Date: 03/19/2018

Examiner: Lisa N. CHAU
Art Unit: 1785
Confirmation No.: 8424
Docket No.: SUSP02US2
Customer No.: 143793
Date: 07/24/2020

Title: **MULTILAYER EXCHANGE SPRING RECORDING MEDIA**

Mail Stop Petitions

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

PETITION TO REVIVE APPLICATION

Dear Examiners Chau and Rickman:

This document is filed in response to the Notice of Abandonment, mailed 06/24/2020. Applicant noted with regret and apologies that the six months statutory period to reply to the Office Action of 11/04/2019 has expired on 05/04/2020. Missing this due date was caused by a docketing oversight, and the entire delay was completely unintentional. In response, Applicant reviewed and strengthened its docketing procedures to prevent such outcomes in the future. Applicant was notified about the Application having gone abandoned on 06/24/2020. In response, Applicant worked with expedience and diligence to draft and file the attached Response to the Office Action.

Applicant hereby respectfully petitions the Office to revive the present, unintentionally abandoned Application. To comply with the requirements of 37 CFR 1.137, Applicant hereby files:

- (1) The Reply required to the outstanding Office Action;
- (2) The petition fee as set forth in §1.17(m); and
- (3) A statement that the entire delay in filing the required reply from the due date for the reply until the filing of a grantable petition pursuant to this section was unintentional.

Respectfully submitted,

Date: 07/24/2020

/Gergely T. Zimanyi/
Gergely T. Zimanyi, Ph.D.
Registration No. 45,754

CERTIFICATE OF TRANSMISSION UNDER 37 CFR 1.8
I hereby certify that this correspondence is being transmitted to
the USPTO via EFS-Web on 07/24/2020.

<u>/Richard A. Pask/</u>	<u>07/24/2020</u>
Richard A. Pask	Date

Gergely T. Zimanyi
11 Dartmouth Drive
Berkeley, CA 94745
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s):	Dieter SUESS	Examiner:	Lisa N. CHAU
Application No.:	15/925,749	Art Unit:	1785
Filing Date:	03/19/2018	Confirmation No.:	8424
		Docket No.:	SUSP02US2
		Customer No.:	143793
		Date:	07/24/2020

Title: **MULTILAYER EXCHANGE SPRING RECORDING MEDIA**

Mail Stop Petitions

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

RESPONSE TO OFFICE ACTION AND TO NOTICE OF ABANDONMENT

Dear Examiner Chau:

This document is filed in response to the Office Action, mailed 11/04/2019, and in response to the Notice of Abandonment, mailed 06/24/2020.

First, Applicant noted with regret and apologies that the six months statutory period to reply has expired on 05/04/2020. Missing this due date was caused by a docketing oversight, and it was entirely unintentional. In response, Applicant reviewed and strengthened its docketing procedures. Applicant was notified about the Application having gone abandoned on 06/24/2020. In response, Applicant worked with expedience and diligence to draft and file the present Response. In parallel, Applicant also filed a Petition to Revive, pursuant to 37 CFR 1.137.

Applicant respectfully requests the reconsideration of the pending claims in light of the herewith submitted amendments and remarks.

Amendments to the Specification start on p. 2. Amendments to the Claims start on p. 6.

Remarks start on p. 11.

SPECIFICATION

Please amend paragraph [0028] as follows:

“[0028] The recording media includes hard magnetic storage layer 24 and softer nucleation host 21. Hard magnetic storage layer 24 can be a ferromagnet, ferrimagnet, antiferromagnet, or any other synthetic antiferromagnetic structure. The coupling between the nucleation host and the hard magnetic storage layer may be ferromagnetic or antiferromagnetic. Hard magnetic storage layer 24 maybe formed from any material that has large perpendicular anisotropy. These materials include tetragonal~~[[:]]~~ L1₀-ordered phase materials, CoPt and FePt based alloys, CoPtCr alloys, including CoPtCrB, CoPtCrTa, ~~and CoCr based granular media-, Other high anisotropy materials~~ suitable for the recording layer 16 include pseudo-binary alloys based on the FePt and CoPt L1₀ phase, i.e., FePt--X and CoPt--X, where the element X may be Ni, Au, Cu, Pd or Ag, as well as granular composite materials such as FePt--C, FePt--ZrO, FePt--MgO, FePt--B₂O₃, materials containing at least one of B, Cu, Ag, W, Mo, Ru, Si, Ge, Nb, Pd, Sm, Nd, Dy, Hf, Mn, Ni and other similar composites.”

Please insert the below new paragraphs [0057]-[0076] after present paragraph [0056] and before present paragraph [0057], and please renumber present paragraph [0057] to [0077]. Since the entire text of paragraphs [0057]-[0076] is new, for clarity's sake, the underlining of the entire text has been omitted.

“[0057] Some embodiments, described throughout this specification, can include a magnetic recording medium, comprising: an essentially non-magnetic substrate; and a magnetic bilayer, comprising: a granular hard magnetic storage layer having a coercive field of H_s without another magnetic layer; and a granular nucleation host, disposed on the hard magnetic storage layer in a columnar manner, having a coercive field H_n without the hard magnetic storage layer, wherein $0.7\text{ T} < H_n < H_s$; and the nucleation host is having a magnetic polarization $J_s = \mu_0 M_s$ between 0.3 T and 1.0 T, wherein the nucleation host and the hard magnetic storage layer are arranged either in direct contact or separated by a coupling layer of less than 5 nm thickness.

[0058] In some embodiments of the magnetic recording medium, the nucleation host and the hard magnetic storage layer are in direct contact.

[0059] In some embodiments of the magnetic recording medium, an exchange coupling between the nucleation host and the hard magnetic storage layer is sufficiently strong and the nucleation host is sufficiently hard so that the derivative k of the normalized magnetization with respect to the external field normalized to the coercive field does not change by more than a factor of 3 in a magnetization interval $-0.7 < M_z/M_s < 0.7$, wherein:

$$k = \frac{dM}{dH} \frac{H_c}{M_s}$$

M being a magnetization of the recording medium, M_z being a component of the magnetization perpendicular to a plane of the recording medium, H being an external magnetic field parallel to a normal of the layers, dM/dH being the derivative of the magnetization with respect to the external magnetic field, H_c being a coercive field, M_s being a saturation magnetization.

[0060] In some embodiments of the magnetic recording medium, a squareness S of a hysteresis loop is less than 10% different from the squareness of the hysteresis loop of the hard magnetic storage layer without the nucleation host.

[0061] In some embodiments of the magnetic recording medium, the hard magnetic storage layer comprises of at least one of Cr, Pt, Ta, B, Fe, Cu, Ag, W, Mo, Ru, Si, Ge, Nb, Co, Pd, Sm, Nd, Dy, Hf, Mn and Ni.

[0062] In some embodiments of the magnetic recording medium, $H_c(\alpha=20^\circ) < H_c(\alpha=45^\circ)$, wherein $H_c(\alpha)$ is the coercive field if the angle between the external field and the film normal is α .

[0063] In some embodiments of the magnetic recording medium, $H_m(\alpha=20^\circ) < H_m(\alpha=45^\circ)$, wherein $H_m(\alpha)$ is the required field to reduce the normalized magnetization from the saturation to -0.5 if the angle between the external field and the film normal is α .

[0064] In some embodiments of the magnetic recording medium, the nucleation host comprises at least one of Fe, Ni, Al, Si, B, Co, Cr, Pt, Ta, Cu, Ag, W, Mo, Ru, Si, Ge, Nb, Co, Pd, Sm, Nd, Dy, Hf, Mn, Ni and O.

[0065] In some embodiments of the magnetic recording medium, the nucleation host comprises grains with an average diameter greater than 2 nm and less than 10 nm.

[0066] In some embodiments of the magnetic recording medium, the thickness of the nucleation host is larger than 7 nm.

[0067] In some embodiments of the magnetic recording medium, the nucleation host is in direct contact with the hard magnetic storage layer.

[0068] In some embodiments of the magnetic recording medium, the nucleation host is coupled to the hard magnetic storage layer by a strong exchange coupling layer.

[0069] In some embodiments of the magnetic recording medium, the nucleation host is coupled to the hard magnetic storage layer by an antiferromagnetic coupling.

[0070] In some embodiments of the magnetic recording medium, parameters of the media structure comprise: a anisotropy constant in the nucleation host K^n ; a hard magnetic storage layer anisotropy constant K^h ; a nucleation host grain diameter; a hard magnetic storage layer grain diameter; an exchange constant between grains in the nucleation host; an exchange constant between grains of the hard magnetic storage layer; a saturation polarization in the nucleation host as a function of the layer depth; a saturation polarization of the hard magnetic storage layer; a layer thickness of the nucleation host; a layer thickness of the magnetic storage layer and an exchange constant between the nucleation host and the hard magnetic storage layer.

[0071] In some embodiments of the magnetic recording medium, the coercive field of the hard magnetic storage layer is determined by at least one of: depositing only the hard magnetic storage on the non-magnetic substrate; removing the nucleation host from a multilayer structure; and performing a micromagnetic calculation with parameters appropriate for the multilayer.

[0072] In some embodiments of the magnetic recording medium, an energy barrier of the hard magnetic storage layer is determined by at least one of: depositing only the hard magnetic storage layer on the non-magnetic substrate; removing the nucleation host from the multilayer structure; and performing a micromagnetic calculation with parameters appropriate for the multilayer.

[0073] In some embodiments of the magnetic recording medium, a parameter of the magnetic bilayer has a value such that a coercive magnetic field of the hard magnetic storage layer is less than 1/2 of the coercive magnetic field of the hard magnetic storage layer without the nucleation host.

[0074] In some embodiments of the magnetic recording medium, a parameter of the magnetic recording medium has a value such that a coercive field of the magnetic recording medium

increases when grains of the recording media are misaligned relative to a normal of the non-magnetic substrate.

[0075] In some embodiments of the magnetic recording medium, the recording medium is usable for perpendicular recording or for recording on patterned elements.

[0076] In some embodiments, a magnetic recording medium is comprising: an essentially non-magnetic substrate; and an exchange coupled magnetic multilayer structure, comprising: a nucleation host with an anisotropy varying in the film normal direction; and a hard magnetic storage layer; wherein a ratio

$$r = \frac{\Delta E_{thermal}}{\Delta E_{hyst}}$$

is in the range of 0.5 to 10 wherein a thermal energy barrier $\Delta E_{thermal}$ separates two magnetic states, and a hysteretic energy loss $\Delta E_{hyst} = J_s H_c V$ is the product of a grain volume V , the coercive field H_c and an average magnetization J_s ."

Further, as requested above, please renumber present paragraph [0057] to renumbered paragraph [0077], without any modification to its text, as follows:

"[0057] [0077] While the present invention has been particularly shown and described with reference to certain embodiments, it will be understood by those skilled in the art that various changes in form and detail may be made without departing from the spirit and scope of the invention. Accordingly, the disclosure was intended merely as illustrative and the scope of the invention is limited only as specified in the appended claims."

CLAIMS

1. (Original) A magnetic recording system, comprising:
a writing head; and
a disk, including a magnetic recording medium, comprising
 an essentially non-magnetic substrate
 an underlayer formed on the non-magnetic substrate; and
 an exchange coupled magnetic multilayer structure, including
 a hard magnetic storage layer, having a first coercive field $H_s > 0.5$ T, formed on the underlayer; and
 a nucleation host, having a second coercive field H_n without the hard magnetic storage layer, lower than the first coercive field, $H_n < H_s$, wherein
 said nucleation host
 is formed on the hard magnetic storage layer such that the hard magnetic storage layer is between the nucleation host and the non-magnetic substrate,
 is exchange coupled to the hard magnetic storage layer, and
 comprises ferromagnetic layers with increasing anisotropy constant K from layer to layer.
2. (Original) The magnetic recording system of claim 1, wherein:
 the nucleation host and the hard magnetic storage layer are in direct contact.
3. (Cancelled)
4. (Currently amended) The magnetic recording system of claim 1, wherein:
 $H_c(\alpha = 20^\circ) < H_c(\alpha = 45^\circ)$, wherein $H_c(\alpha)$ is a coercive field of the magnetic recording medium if an angle between an external field and a normal of the magnetic recording medium is α .

5. (Original) The magnetic recording system of claim 1, wherein:
the nucleation host comprises grains with an average diameter greater than 2 nm and less than 10 nm.
6. (Original) The magnetic recording system of claim 1, wherein:
a coupling layer is disposed between the nucleation host and the hard magnetic storage layer.
7. (Original) The magnetic recording system of claim 1, wherein:
the nucleation host is separated from the hard magnetic storage layer by a layer of thickness less than 5 nm.
8. (Original) A magnetic recording medium, comprising:
an essentially non-magnetic substrate;
an underlayer formed on the non-magnetic substrate; and
an exchange coupled magnetic multilayer structure, including
a hard magnetic storage layer, having a first coercive field $H_s > 0.5$ T, formed on the underlayer; and
a nucleation host, having a second coercive field H_n without the hard magnetic storage layer, lower than the first coercive field, $H_n < H_s$, wherein
said nucleation host
is formed on the hard magnetic storage layer such that the hard magnetic storage layer is between the nucleation host and the non-magnetic substrate,
is exchange coupled to the hard magnetic storage layer, and
comprises ferromagnetic layers with increasing anisotropy constant K from layer to layer, wherein at least two of the ferromagnetic layers are coupled with a thin exchange coupling layer.
9. (Cancelled)
10. (Cancelled)

11. (Original) The magnetic recording medium of claim 8, wherein:

$H_c(\alpha=20^\circ) < H_c(\alpha=45^\circ)$, wherein $H_c(\alpha)$ is a coercive field of the recording medium if an angle between an external field and a normal of the recording medium is α .

12. (Original) The magnetic recording medium of claim 8, wherein:

the nucleation host comprises grains with an average diameter greater than 2 nm and less than 10 nm.

13. (Withdrawn) A magnetic recording medium, comprising:

an essentially non-magnetic substrate;

an underlayer formed on the non-magnetic substrate; and

an exchange coupled magnetic multilayer structure, including

a hard magnetic storage layer, formed from a large perpendicular anisotropy material based on at least one of Fe and Co, having a first coercive field H_s , formed on the underlayer; and

a nucleation host, having a second coercive field H_n without the hard magnetic storage layer, lower than the first coercive field, $H_n < H_s$, wherein

said nucleation host

is formed on the hard magnetic storage layer such that the hard magnetic storage layer is between the nucleation host and the non-magnetic substrate,

is exchange coupled to the hard magnetic storage layer, and

comprises ferromagnetic layers with increasing anisotropy constant K from layer to layer.

14. (Withdrawn) The magnetic recording medium of claim 13, wherein:

the large perpendicular anisotropy material is an FePt based alloy.

15. (Withdrawn) The magnetic recording medium of claim 13, wherein:

the large perpendicular anisotropy material is an L1₀-ordered phase material.

16. (Withdrawn) The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material is one of a CoPt based alloy, and a CoPtCr alloy.

17. (Withdrawn) The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material is one of a CoPtCrB, CoPtCrTa, and CoCr based granular media.

18. (Withdrawn) The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material is an alloy based on FePt--X, wherein X is one of Ni, Au, Cu, Pd and Ag.

19. (Withdrawn) The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material is an alloy based on CoPt--X, wherein X is one of Ni, Au, Cu, Pd and Ag.

20. (Withdrawn) The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material is a granular composite material based on FePt-C.

21. (Withdrawn) The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material is a granular composite material, selected from the group consisting of FePt-ZrO, FePt--MgO, and FePt--B₂O₃.

22. (Withdrawn) The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material is additionally formed from materials, selected from the group consisting of B, Cu, Ag, W, Mo, Ru, Ge, Nb, Pd, Sm, Nd, Dy, Hf, Mn, Ni.

23. (Withdrawn) The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material includes Silicon.

24. (Withdrawn) The magnetic recording system of claim 13, wherein the nucleation host comprises:

Oxygen.

REMARKS

Claims 1-24 are pending in the present Application. With this Response, Applicant withdraws claims 13-24, cancels claims 3, 9, and 10, and amends claim 4. All claim amendments are fully supported by the Specification. No new matter has been added.

SPECIFICATION

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Please amend the Specification to disclose the limitations in Claims 3, 5, 7, and 12.

In response, Applicant respectfully follows the Office's instructions and amends the Specification by copying the originally filed claims into the Specification. The same amendment of the Specification in the parent case, filed in the Office Action response of 08/13/2017, has been previously accepted by the Office. Applicant's amendment is again guided by MPEP 2163.I that provides:

“While early opinions suggested that the Patent and Trademark Office was unwilling to find written descriptive support when the only description was found in the claims, this viewpoint was rejected. See *In re Koller*, 613 F.2d 819, 204 USPQ 702 (CCPA 1980) (original claims constitute their own description); accord *In re Gardner*, 475 F.2d 1389, 177 USPQ 396 (CCPA 1973); accord *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976). It is now well accepted that a satisfactory description may be in the claims or any other portion of the originally filed specification”.

With this guidance by the MPEP, Applicant argues that the originally filed claims constituted their own description, and thus “provided proper antecedent basis for the claimed subject matter”.

MPEP 2163.I.B further provides that Applicant can make the presence of support even clearer by “amend[ing] the specification to include the claimed subject matter”:

“The claims as filed in the original specification are part of the disclosure and, therefore, if an application as originally filed contains a claim disclosing material not found in the remainder of the specification, the applicant may amend the specification to include the claimed subject matter. *In re Benno*, 768 F.2d 1340, 226 USPQ 683 (Fed. Cir. 1985).”

With this Response, Applicant follows the instructions of MPEP 2163.I.B and copies the text of originally filed claims into the Specification as paragraphs [0057]-[0076], with only minimal modifications as required by grammar. Separately, in order to maintain coherence with the parent application, Applicant also amends paragraph [0028] by deleting a few words.

With this preparation and amendments, Applicant responds to the objections by furnishing a list of paragraphs of the just-amended Specification that provide antecedent basis for the claims identified in the Office Action. Providing these sections is not meant to represent that these would be the only places that provide support for the claimed subject matter. On the contrary, other paragraphs and sections may offer additional support for the claims. Therefore, the list below is presented only as examples where support for the identified claims has been described in the Specification:

Claim 3 – cancelled;

claim 5 – paragraph [0065];

claim 7 – paragraph [0057]; and

claim 12 – paragraph [0065].

REJECTIONS UNDER 35 U.S.C. § 112

Claims 9 and 10 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement.

In response, Applicant cancelled claims 9 and 10.

Claim 4 is 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 pre-AIA the applicant regards as the invention. Claim 4 recites the limitation "the recording medium" (emphasis added). There is insufficient antecedent basis for this limitation in the claim.

In response, Applicant is pointing to claim 1 that recites, in pertinent part:

“1. (Original) A magnetic recording system, comprising:
a writing head; and
a disk, including a magnetic recording medium, ...”

Applicant interprets the rejection to mean that claim 1 is perceived to provide antecedent basis for a “magnetic recording medium”, not simply for a “recording medium”, and therefore the Office invites Applicant to insert the word “magnetic” into the claim. Therefore, in response, Applicant

inserted the word “magnetic” into the claim to recite a “magnetic recording medium”. If the Office’s intention was different, Applicant is prepared to make the expected different amendment.

DOUBLE PATENTING

Claims 1-12 are rejected on the ground of nonstatutory double patenting as being unpatentable over Claims 1-23 of U.S. Patent No. 9,928,864.

In response, Applicant is attaching a Terminal Disclaimer herewith to overcome the rejection over the commonly owned U.S. Patent No. 9,928,864, in compliance with 37 CFR 1.321.

Claims 13-24 are rejected on the ground of nonstatutory double patenting as being unpatentable over Claims 1-23 of U.S. Patent No. 9,928,864 in view of US Pub. No. 20030108721 (“Fullerton2”).

In response, Applicant is attaching a Terminal Disclaimer herewith to overcome the rejection over the commonly owned U.S. Patent No. 9,928,864, in compliance with 37 CFR 1.321.

Claims 1-24 are provisionally rejected on the ground of nonstatutory double patenting as being unpatentable over Claims 1-26 of copending Application No. 15/985,661 in view of US Pub. No. 20070243418 (“Fullerton et al.”).

In response, Applicant is attaching a Terminal Disclaimer herewith to overcome the rejection over the commonly owned copending US Application No. 15/985,661, in compliance with 37 CFR 1.321.

Claims 1-24 are rejected on the ground of nonstatutory double patenting as being unpatentable over Claims 1-45 of U.S. Patent No. 9,978,413 in view of US Pub. No. 20070243418 (“Fullerton et al.”).

In response, Applicant is attaching a Terminal Disclaimer herewith to overcome the rejection over the commonly owned U.S. Patent No. 9,978,413, in compliance with 37 CFR 1.321.

REJECTIONS UNDER 35 U.S.C. § 103

Claim 13, 16, 17, and 22-24 are rejected under pre-A IA 35 U.S.C. 103(a) as being unpatentable over US Pub. No. 20070243418 (“Fullerton et al.”).

In response, Applicant cancelled claims 13-24.

Claims 14, 15, and 18-21 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over US Pub. No. 20070243418 ("Fullerton et al.") as applied to Claim 13 above, and further in view of US Pub. No. 20030108721 ("Fullerton2").

In response, Applicant cancelled claims 13-24.

CONCLUSIONS

In view of the foregoing, Applicant respectfully requests the reconsideration of the pending claims and the withdrawal of the present rejection. All of the claims in the Application are now believed to be allowable. Favorable consideration and a Notice of Allowance are therefore earnestly solicited. If for any reason the Examiner finds the Application other than in condition for allowance, the Examiner is kindly requested to contact the undersigned Gergely T. Zimanyi, Ph.D. at 530-400-3936 to discuss the steps necessary for placing the Application in condition for allowance.

Respectfully submitted,

Date: 07/24/2020

/Gergely T. Zimanyi/
Gergely T. Zimanyi, Ph.D.
Registration No. 45,754

CERTIFICATE OF TRANSMISSION UNDER 37 CFR 1.8
I hereby certify that this correspondence is being transmitted to the
USPTO via EFS-Web on 07/24/2020.

<u>/Richard A. Pask/</u>	<u>07/24/2020</u>
Richard A. Pask	Date

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/925,749	03/19/2018	Dieter Suess	SUSP02US2	8424
143793	7590	06/24/2020	EXAMINER	
Gergely T. Zimanyi 11 Dartmouth Drive Berkeley, CA 94705			CHAU, LISA N	
			ART UNIT	PAPER NUMBER
			1785	
			NOTIFICATION DATE	DELIVERY MODE
			06/24/2020	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):

gzimanyi@gmail.com
richepask@gmail.com

<i>Notice of Abandonment</i>	Application No.	Applicant(s)
	15/925,749	Suess, Dieter
	Examiner	Art Unit
	LISA CHAU	1785

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

This application is abandoned in view of:

1. ☒ Applicant's failure to timely file a proper reply to the Office letter mailed on 04 November 2019.
 - (a) ☐ A reply was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply (including a total extension of time of _____ month(s)) which expired on _____.
 - (b) ☐ A proposed reply was received on _____, but it does not constitute a proper reply under 37 CFR 1.113 to the final rejection. (A proper reply under 37 CFR 1.113 to a final rejection consists only of: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) if this is utility or plant application, a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. Note that RCEs are not permitted in design applications.)
 - (c) ☐ A reply was received on _____ but it does not constitute a proper reply, or a bona fide attempt at a proper reply, to the non-final rejection. See 37 CFR 1.85(a) and 1.111. (See explanation in box 8 below).
 - (d) ☒ No reply has been received.
2. ☐ Applicant's failure to timely pay the required issue fee and publication fee, if applicable, within the statutory period of three months from the mailing date of the Notice of Allowance (PTOL-85).
 - (a) ☐ The issue fee and publication fee, if applicable, was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the statutory period for payment of the issue fee (and publication fee) set in the Notice of Allowance (PTOL-85).
 - (b) ☐ The submitted fee of \$ _____ is insufficient. A balance of \$ _____ is due.
The issue fee required by 37CFR 1.18 is \$ _____. The publication fee, if required by 37 CFR 1.18(d), is \$ _____.
 - (c) ☐ The issue fee and publication fee, if applicable, has not been received.
3. ☐ Applicant's failure to timely file corrected drawings as required by, and within the three-month period set in, the Notice of Allowability (PTO-37).
 - (a) ☐ Proposed corrected drawings were received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply.
 - (b) ☐ No corrected drawings have been received.
4. ☐ The letter of express abandonment which is signed by the attorney or agent of record or other party authorized under 37 CFR 1.33 (b). See 37 CFR 1.138(b).
5. ☐ The letter of express abandonment which is signed by an attorney or agent (acting in a representative capacity under 37 CFR 1.34) upon the filing of a continuing application.
6. ☐ The decision by the Patent Trial and Appeal Board rendered on _____ and because the period for seeking court review of the decision has expired and there are no allowed claims.
7. ☐ The dismissal of the appeal in an application having no allowed claims. (When an appeal is dismissed in an application having no allowed claims the application stands abandoned. See MPEP 1215.04 subsections I-V for an explanation of the reasons why an appeal is dismissed.)
8. ☐ The reason(s) below:

/LC/ Lisa Chau	/HOLLY C RICKMAN/ Primary Examiner, Art Unit 1785
-------------------	--

Petitions to revive under 37 CFR 1.137, or requests to withdraw the holding of abandonment under 37 CFR 1.181, should be promptly filed to minimize any negative effects on patent term.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/925,749	03/19/2018	Dieter Suess	SUSP02US2	8424
143793	7590	11/04/2019	EXAMINER	
Gergely T. Zimanyi 11 Dartmouth Drive Berkeley, CA 94705			CHAU, LISA N	
			ART UNIT	PAPER NUMBER
			1785	
			NOTIFICATION DATE	DELIVERY MODE
			11/04/2019	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):

gzimanyi@gmail.com
richepask@gmail.com

Office Action Summary	Application No. 15/925,749	Applicant(s) Suess, Dieter	
	Examiner LISA CHAU	Art Unit 1785	AIA (FITF) Status No

-- 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 3/19/18.
 ☐ 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) 1-24 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) 1-24 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 3/19/18 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 is being examined under the pre-AIA first to invent provisions.

Information Disclosure Statement

2. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Specification

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Please amend the Specification to disclose the limitations in Claims 3, 5, 7, and 12.

Claim Rejections - 35 USC § 112

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

(a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of the first paragraph of pre-AIA 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 9 and 10 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for pre-AIA the inventor(s), at the time the application was filed, had possession of the claimed invention.

The Specification does not necessarily provide support for multiple thin exchange coupling layers within a nucleation host, wherein the thin exchange coupling layer provides an exchange constant A in excess of $A=10^{-14}$ J/m. Examiner notes that the claimed property, exchange constant A , refers to the coupling layer between the nucleation host and hard magnetic storage layer, not necessarily the thin exchange coupling layer(s) within the nucleation host (Please see [0033] in Applicant's Specification).

6. 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.

7. Claim 4 is 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 pre-AIA the applicant regards as the invention.

Claim 4 recites the limitation "the recording medium" (emphasis added). There is insufficient antecedent basis for this limitation in the claim.

Double Patenting

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or

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

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(l)(1) - 706.02(l)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

9. Claims 1-12 are rejected on the ground of nonstatutory double patenting as being unpatentable over Claims 1-23 of U.S. Patent No. 9928864. Although the claims at issue are not identical, they are not patentably distinct from each other because the subject matter sought is substantially covered by the subject matter in the US Patent.

10. Claims 13-24 are rejected on the ground of nonstatutory double patenting as being unpatentable over Claims 1-23 of U.S. Patent No. 9928864 in view of US Pub. No. 20030108721 ("Fullerton2").

The subject matter sought is substantially covered by the subject matter in US Patent No. 9928864.

US Patent No. 9928864 does teach the claimed perpendicular anisotropy material.

However, Fullerton2 teaches a perpendicular anisotropy material comprising an L1₀-ordered phase material, FePt based alloy, FePt-X or CoPt-X wherein X is Ni, Au, Cu, Pd, and Ag, FePtC, or a granular composite selected from FePt-ZrO, FePt-MgO, and FePt-B₂O₃ [0024]. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to have US Patent No. 9928864's large perpendicular anisotropy material comprise of the materials disclosed by Fullerton2 in order to obtain a material with high magneto-crystalline anisotropy, magnetic moment, and allow additional control over the magnetic and structural properties of the media, all are which are desirable for high-density magnetic recording materials [0024].

11. Claims 1-24 are provisionally rejected on the ground of nonstatutory double patenting as being unpatentable over Claims 1-26 of copending Application No. 15985661 in view of US Pub. No. 20070243418 ("Fullerton et al.").

The subject matter sought is substantially covered by the subject matter in copending Application No. 15985661.

Copending Application No. 15985661 does teach the claimed ferromagnetic layers with increasing anisotropy constant K from layer to layer.

However, Fullerton et al. further teaches that its nucleation host comprises ferromagnetic layers ([0022] and layers between MAG2 in RL1 to MAG2 in RL2 as shown in Fig. 6), wherein ferromagnetic layers have different anisotropy H_k from each other ([0022] and [0023]). While Fullerton et al. does not teach the claimed anisotropy in terms of anisotropy constant K , the Examiner deems that it would have been obvious to one of ordinary skill in the art that Fullerton et al. teaching of different H_k values from layer to layer will also have its ferromagnetic layers with increasing anisotropy constant K from layer to layer. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to have the copending Application No. 15985661's nucleation host comprise of ferromagnetic layers with increasing anisotropy constant K from layer to layer to produce a magnetic recording medium with improved writability and higher SNR (Abstract).

This is a provisional nonstatutory double patenting rejection.

12. Claims 1-24 are rejected on the ground of nonstatutory double patenting as being unpatentable over Claims 1-45 of U.S. Patent No. 9978413 in view of US Pub. No. 20070243418 ("Fullerton et al.").

The subject matter sought is substantially covered by the subject matter in U.S. Patent No. 9978413.

U.S. Patent No. 9978413 does teach the claimed ferromagnetic layers with increasing anisotropy constant K from layer to layer.

However, Fullerton et al. further teaches that its nucleation host comprises ferromagnetic layers ([0022] and layers between MAG2 in RL1 to MAG2 in RL2 as shown in Fig. 6), wherein ferromagnetic layers have different anisotropy H_k from each other ([0022] and [0023]). While Fullerton et al. does not teach the claimed anisotropy in terms of anisotropy constant K , the

Examiner deems that it would have been obvious to one of ordinary skill in the art that Fullerton et al. teaching of different H_k values from layer to layer will also have its ferromagnetic layers with increasing anisotropy constant K from layer to layer. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to have U.S. Patent No. 9978413's nucleation host comprise of ferromagnetic layers with increasing anisotropy constant K from layer to layer to produce a magnetic recording medium with improved writability and higher SNR (Abstract).

Claim Rejections - 35 USC § 103

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

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

14. Claim 13, 16, 17, and 22-24 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over US Pub. No. 20070243418 ("Fullerton et al.").

With regards to Claim 13, Fullerton et al. teaches a magnetic recording medium comprising an essentially non-magnetic substrate, an underlayer formed on the non-magnetic substrate, and an exchange coupled magnetic multilayer structure (RL1 and RL2) (Abstract, Fig. 6, and [0026]-[0030]). The exchange coupled magnetic multilayer structure includes a hard magnetic storage layer (MAG1 in RL1), formed from a large perpendicular anisotropy material based on at least one of Fe and Co, having a first coercive field H_s and formed on the underlayer, and a nucleation host (MAG2 in RL1 and relevant thereof), having a second coercive field H_n without the hard magnetic storage layer, lower than the first coercive field, $H_n < H_s$, wherein said nucleation host is formed on the hard magnetic storage layer such that the

hard magnetic storage layer is between the nucleation host and the non-magnetic storage layer (Fig. 6, [0012], [0022]-[0024], and [0029]).

Fullerton et al. further teaches that its nucleation host comprises ferromagnetic layers ([0022] and layers between MAG2 in RL1 to MAG2 in RL2 as shown in Fig. 6), wherein ferromagnetic layers have different anisotropy H_k from each other ([0022] and [0023]). While Fullerton et al. does not teach the claimed anisotropy in terms of anisotropy constant K , the Examiner deems that it would have been obvious to one of ordinary skill in the art that Fullerton et al. teaching of different H_k values from layer to layer will also have its ferromagnetic layers with increasing anisotropy constant K from layer to layer to produce a magnetic recording medium with improved writability and higher SNR (Abstract).

With regards to Claim 16, Fullerton et al. teaches the large perpendicular anisotropy material is one of a CoPt based alloy and a CoPtCr alloy [0029].

With regards to Claim 17, Fullerton et al. teaches the large perpendicular anisotropy material is CoCr based granular media ([0024] and [0029]).

With regards to Claims 22-24, Fullerton et al. teaches the hard magnetic storage layer and nucleation host having the claimed materials (Please see [0029]).

15. Claims 14, 15, and 18-21 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over US Pub. No. 20070243418 ("Fullerton et al.") as applied to Claim 13 above, and further in view of US Pub. No. 20030108721 ("Fullerton2").

Fullerton et al. teaches the large anisotropy material based on at least one of Fe and Co as set forth above [0029].

Fullerton et al. does not teach the claimed materials for its large perpendicular anisotropy material.

However, Fullerton2 teaches a perpendicular anisotropy material comprising an L1₀-ordered phase material, FePt based alloy, FePt-X or CoPt-X wherein X is Ni, Au, Cu, Pd, and Ag, FePtC, or a granular composite selected from FePt-ZrO, FePt-MgO, and FePt-B₂O₃ [0024]. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to have Fullerton et al.'s large perpendicular anisotropy material comprise of the claimed materials, as demonstrated by Fullerton2, in order to obtain a material with high magneto-crystalline anisotropy, magnetic moment, and allow additional control over the magnetic and structural properties of the media, all are which are desirable for high-density magnetic recording materials [0024].

Conclusion

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LISA CHAU whose telephone number is (571)270-5496. The examiner can normally be reached on Monday-Friday 11 AM-730 PM.

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, Mark Ruthkosky can be reached on (571) 272-1291. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/LC/
Lisa Chau
Art Unit 1785

/HOLLY C RICKMAN/
Primary Examiner, Art Unit 1785

Notice of References Cited	Application/Control No. 15/925,749		Applicant(s)/Patent Under Reexamination Suess, Dieter	
	Examiner LISA CHAU		Art Unit 1785	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-20070243418-A1	10-2007	Fullerton; Eric E.	G11B5/65	428/828
*	B	US-20030108721-A1	06-2003	Fullerton, Eric E.	G11B5/66	428/195.1
*	C	US-9928864-B2	03-2018	Suess; Dieter	B82Y25/00	1/1
*	D	US-9978413-B2	05-2018	Suess; Dieter	B82Y25/00	1/1
	E					
	F					
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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	US App. No. 15985661
	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.

U.S. Patent and Trademark Office
PTO-892 (Rev. 01-2001)

Notice of References Cited

Part of Paper No. 20191007

<i>Search Notes</i> 	Application/Control No. 15/925,749	Applicant(s)/Patent Under Reexamination Suess, Dieter
	Examiner LISA CHAU	Art Unit 1785

CPC - Searched*		
Symbol	Date	Examiner
G11B 5/+	10/25/2019	LC
G11B 2005/0029, 3996	10/25/2019	LC
G11B 20/10, 1217	10/25/2019	LC
G11B 2020/10898, 1281	10/25/2019	LC
G11B 2220/235, 2516	10/25/2019	LC
H01F 10/3295, 30, 12, 3218, 324	10/25/2019	LC
H01F 41/0206, 18, 30, 302, 303, 305, 32	10/25/2019	LC

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner
428	800+		

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

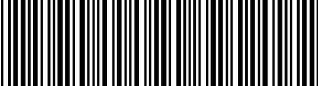
Search Notes		
Search Notes	Date	Examiner
Inventor	10/25/2019	LC
Prosecution histories on App. No. 11424859 and 12619849	10/25/2019	LC
All classification searched with TEXT	10/25/2019	LC

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<i>Search Notes</i> 	Application/Control No. 15/925,749	Applicant(s)/Patent Under Reexamination Suess, Dieter
	Examiner LISA CHAU	Art Unit 1785

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

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<i>Index of Claims</i> 	Application/Control No. 15/925,749	Applicant(s)/Patent Under Reexamination Suess, Dieter
	Examiner LISA CHAU	Art Unit 1785

✓	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	10/25/2019								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
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	19	✓								
	20	✓								
	21	✓								
	22	✓								
	23	✓								
	24	✓								

Bibliographic Data

Application No: 15/925,749

Foreign Priority claimed: ☐ Yes ☒ No

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

Verified and Acknowledged:

/LISA N CHAU/

Examiner's Signature

Initials

Title:

MULTILAYER EXCHANGE SPRING RECORDING MEDIA

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
03/19/2018	428	1785	SUSP02US2
RULE			

APPLICANTS

INVENTORS

Dieter Suess Herzogenburg, AUSTRIA

CONTINUING DATA

This application is a CON of 12619849 11/17/2009 PAT 9928864

12619849 is a DIV of 11424859 06/17/2006 PAT 9978413

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

04/16/2018

**** SMALL ENTITY ****

STATE OR COUNTRY

AUSTRIA

ADDRESS

Gergely T. Zimanyi
11 Dartmouth Drive
Berkeley, CA 94705
UNITED STATES

FILING FEE RECEIVED

\$985

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	2	((DIETER) near2 (SUESS)).INV.	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 10:22
S2	1	((DIETER) near2 (SUESS)).INV.	EPO; JPO; DERWENT	ADJ	ON	2011/01/07 10:23
S3	10	((("5583727") or ("6280813") or ("6383668") or ("6468670") or ("20070292720")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2011/01/07 10:24
S4	25	("5569533" "5815342" "6294490").PN. OR ("6383668").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:18
S5	826	(428/827,828,828.1,829).ccls.	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:31
S6	604	S5 and anisotropy	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:31
S7	12	S5 and anisotropy and host	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:32
S8	1	"20100165508"	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:37
S9	46	vary\$6 anisotropy	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:40
S10	2	S9 and "428"/	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:40
S11	4988	(varies\$5 or vary\$6) same anisotropy	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:52
S12	483	S11 and "428"/	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:52

EAST Search History

S13	1651	(varies\$5 or vary\$6) near12 anisotropy	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:53
S14	1752	(varies\$5 or vary\$6) near15 anisotropy	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:53
S15	167	S14 and "428"/	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:53
S16	115	S14 and recording.ab.	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/07 11:54
S17	4	"20030180577" or "20060228586" or "20060222901"	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/11 14:20
S19	3	"20060177700"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 11:17
S20	3	"20060177704"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 11:19
S21	2	"20050058855"	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/12 16:06
S22	12	"18" and (anti\$1ferro\$1magnet\$5 coupl\$5) and (diameter same grain same height)	US-PGPUB; USPAT; USOCR	ADJ	ON	2011/01/12 16:07
S23	12	"18" and (anti\$1ferro\$1magnet\$5 coupl\$5) and (diameter same grain same height)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:07
S24	3445	"18" and (diameter same grain same height)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:08
S25	37	"18" and (diameter same grain same height) and (perpendicular.ab.)	US-PGPUB; USPAT; USOCR;	ADJ	ON	2011/01/12 16:08

			FPRS; EPO; JPO; DERWENT			
S26	828	(428/827,828,828.1,829).ccls.	US- PGPUB; USPAT; USOCR	ADJ	ON	2011/01/12 16:10
S27	5	S26 and (diameter same grain same height) and (perpendicular.ab.)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:10
S28	2	S26 and (anti\$1ferro\$1magnet\$5 coupl\$5) and (diameter same grain same height)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:12
S29	29	S26 and (height same diameter)	US- PGPUB; USPAT; USOCR	ADJ	ON	2011/01/12 16:13
S30	29	S26 and (height same diameter)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:13
S31	67	(perpendicular near3 recording).ab. and (height same diameter)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:30
S32	119	(perpendicular near3 recording).ab. and (thickness same (granular or grain) same diameter)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:35
S33	15	(perpendicular near3 recording).ab. and (height same (granular or grain) same diameter)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:38
S34	74	(magnetic recording medium).ab. and (height same (granular or grain) same diameter)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:38

S35	5	(magnetic recording medium).ab. and (height same (granular or grain) same average diameter)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:42
S36	116	(magnetic recording medium).ab. and ((granular or grain) same average diameter)	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2011/01/12 16:43
S37	1851	(varies\$5 or vary\$6) near15 anisotropy	US- PGPUB; USPAT; USOCR	ADJ	ON	2011/07/12 13:38
S38	859	(428/827,828,828.1,829).ccls.	US- PGPUB; USPAT; USOCR	ADJ	ON	2011/07/12 13:38
S39	20	S37 and S38	US- PGPUB; USPAT; USOCR	ADJ	ON	2011/07/12 13:38
S40	42	428/8\$.ccls. and (grad\$5 near2 anisotrop\$5)	US- PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2013/11/01 14:29
S41	3	"20060222901"	US- PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2013/11/01 14:32
S42	34	lisa near3 chau	US- PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2013/11/01 17:19
S43	5	"20040057156" or "20040053078"	US- PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2013/11/01 17:34
S44	2	"20040013910"	US- PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2013/11/01 17:47
S45	8	"6759149"	US- PGPUB; USPAT; USOCR;	ADJ	OFF	2013/11/01 17:50

			EPO; JPO; DERWENT			
S46	3	"20060177704"	US- PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2013/11/01 17:50
S47	14	"20040086753" or "20040013910" or "6610424"	US- PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2013/11/01 17:57
S48	47	428/8\$.ccls. and (grad\$5 near2 anisotrop\$5)	US- PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2014/08/22 14:55
S49	1117	(428/827,828,828.1,829).ccls.	US- PGPUB; USPAT; USOCR	ADJ	ON	2014/12/28 15:58
S50	1027	S49 AND ((G11B5/66 OR G11B5/65 OR G11B5/7325 OR G11B5/667 OR G11B5/82 OR G11B5/855 OR G11B5/84 OR G11B5/746 OR G11B5/656 OR G11B5/732 OR G11B5/8404 OR G11B5/72 OR G11B5/64 OR G11B5/653 OR G11B5/851 OR G11B5/1278 OR G11B5/738 OR G11B5/743 OR G11B2005/0021 OR G11B2005/0024 OR G11B2005/0029 OR G11B5/3906 OR G11B5/3909 OR G11B2020/1281 OR G11B20/10 OR G11B20/1217 OR G11B2220/235 OR G11B2220/2516 OR G11B5/1276 OR G11B5/235 OR G11B5/3113 OR G11B5/314 OR G11B5/3146 OR G11B5/3153 OR G11B5/3163 OR G11B5/3929 OR G11B5/3983 OR G11B5/6088 OR G11B5/645 OR G11B5/647 OR G11B5/70605 OR G11B5/70626 OR G11B5/708 OR G11B5/716 OR G11B5/7315 OR G11B5/735 OR G11B5/85 OR G11B5/865).CPC.)	US- PGPUB; USPAT; USOCR	ADJ	ON	2014/12/28 15:58
S51	26	S50 and (grad\$5 near2 anisotrop\$5)	US- PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2014/12/28 15:58
S52	32	(428/827,828,828.1,829).ccls. and (grad\$5 near2 anisotrop\$5)	US- PGPUB; USPAT; USOCR	ADJ	ON	2015/06/24 17:23
S53	2	Jp "03254421"	US- PGPUB; USPAT; USOCR;	ADJ	ON	2016/02/23 16:46

			FPRS; EPO; JPO; DERWENT			
S54	33	(428/827,828,828.1,829).ccls. and (grad\$5 near2 anisotrop\$5)	US- PGPUB; USPAT; USOCR	ADJ	ON	2016/02/23 18:20
S55	56	chau near3 lisa	US- PGPUB; USPAT; USOCR	ADJ	ON	2016/08/29 16:26
S56	4	"20010051287"	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2016/08/29 19:25
S57	8	"20050058855"	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2016/08/29 19:39
S58	1161	(428/827,828,828.1,829).ccls.	US- PGPUB; USPAT; USOCR	ADJ	ON	2017/06/11 17:15
S59	1070	S58 AND ((G11B5/66 OR G11B5/65 OR G11B5/7325 OR G11B5/667 OR G11B5/82 OR G11B5/855 OR G11B5/84 OR G11B5/746 OR G11B5/656 OR G11B5/732 OR G11B5/8404 OR G11B5/72 OR G11B5/64 OR G11B5/653 OR G11B5/851 OR G11B5/1278 OR G11B5/738 OR G11B5/743 OR G11B2005/0021 OR G11B2005/0024 OR G11B2005/0029 OR G11B5/3906 OR G11B5/3909 OR G11B2020/1281 OR G11B20/10 OR G11B20/1217 OR G11B2220/235 OR G11B2220/2516 OR G11B5/1276 OR G11B5/235 OR G11B5/3113 OR G11B5/314 OR G11B5/3146 OR G11B5/3153 OR G11B5/3163 OR G11B5/3929 OR G11B5/3983 OR G11B5/6088 OR G11B5/645 OR G11B5/647 OR G11B5/70605 OR G11B5/70626 OR G11B5/708 OR G11B5/716 OR G11B5/7315 OR G11B5/735 OR G11B5/85 OR G11B5/865).CPC.)	US- PGPUB; USPAT; USOCR	ADJ	ON	2017/06/11 17:15
S60	34	S59 and (grad\$5 near2 anisotrop\$5)	US- PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	OFF	2017/06/11 17:15
S68	23	((("20010051287") or ("20040053078") or ("20040057156") or ("20070292720") or ("5583727") or ("6280813") or	US- PGPUB; USPAT;	OR	OFF	2017/12/04 12:42

		("6383668") or ("6468670") or ("7550210")).PN.	USOCR; FPRS; EPO; JPO; DERWENT			
S69	80	lisa near2 chau	US- PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	ADJ	ON	2019/10/09 11:39
S70	1	"20180211689"	US- PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:00
S71	2303	((G11B5/64 OR G11B5/66).CPC.)	US- PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:01
S72	1161	(428/827,828,828.1,829).ccls.	US- PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:01
S73	1110	S72 AND ((G11B5/66 OR G11B5/65 OR G11B5/7325 OR G11B5/667 OR G11B5/82 OR G11B5/656 OR G11B5/84 OR G11B5/855 OR G11B5/7379 OR G11B5/746 OR G11B5/851 OR G11B2005/0021 OR G11B2005/0024 OR G11B5/64 OR G11B5/653 OR G11B5/73 OR G11B5/1278 OR G11B5/8404 OR G11B5/314 OR G11B5/743 OR G11B5/3909 OR G11B5/72 OR G11B5/7315 OR G11B2005/0029 OR G11B2005/3996 OR G11B20/10 OR G11B5/1276 OR G11B5/85 OR G11B2020/10898 OR G11B2020/1281 OR G11B20/1217 OR G11B2220/235 OR G11B2220/2516 OR G11B5/127 OR G11B5/1272 OR G11B5/235 OR G11B5/3113 OR G11B5/3133 OR G11B5/3146 OR G11B5/3153 OR G11B5/3163 OR G11B5/3906 OR G11B5/3912 OR G11B5/3929 OR G11B5/6088 OR G11B5/645 OR G11B5/647 OR G11B5/706 OR G11B5/70605 OR G11B5/708 OR G11B5/716 OR G11B5/735 OR G11B5/865 OR H01F10/3286 OR H01F10/123 OR H01F10/3254 OR H01F10/3272 OR H01F10/329 OR H01F10/3295 OR H01F10/30 OR H01F41/0206 OR H01F10/12 OR H01F10/3218 OR H01F10/324 OR H01F41/18 OR H01F41/30 OR H01F41/302 OR H01F41/303 OR H01F41/305 OR H01F41/32 OR Y10T428/115 OR Y10T29/4902 OR Y10T29/49032 OR Y10T29/49067 OR Y10T428/12458 OR Y10T428/12465 OR Y10T428/12931 OR Y10T428/26 OR Y10T428/265 OR Y10T156/10 OR Y10T29/49021 OR	US- PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:01

		Y10T29/49043 OR Y10T29/49044 OR Y10T29/49048 OR Y10T29/49052 OR Y10T428/11 OR Y10T428/1107 OR Y10T428/1114 OR Y10T428/1121 OR Y10T428/1143 OR Y10T428/24273 OR Y10T428/315 OR Y10T83/04).CPC.)				
S74	96979	((G11B5/66 OR G11B5/65 OR G11B5/7325 OR G11B5/667 OR G11B5/82 OR G11B5/656 OR G11B5/84 OR G11B5/855 OR G11B5/7379 OR G11B5/746 OR G11B5/851 OR G11B2005/0021 OR G11B2005/0024 OR G11B5/64 OR G11B5/653 OR G11B5/73 OR G11B5/1278 OR G11B5/8404 OR G11B5/314 OR G11B5/743 OR G11B5/3909 OR G11B5/72 OR G11B5/7315 OR G11B2005/0029 OR G11B2005/3996 OR G11B20/10 OR G11B5/1276 OR G11B5/85 OR G11B2020/10898 OR G11B2020/1281 OR G11B20/1217 OR G11B2220/235 OR G11B2220/2516 OR G11B5/127 OR G11B5/1272 OR G11B5/235 OR G11B5/3113 OR G11B5/3133 OR G11B5/3146 OR G11B5/3153 OR G11B5/3163 OR G11B5/3906 OR G11B5/3912 OR G11B5/3929 OR G11B5/6088 OR G11B5/645 OR G11B5/647 OR G11B5/706 OR G11B5/70605 OR G11B5/708 OR G11B5/716 OR G11B5/735 OR G11B5/865 OR H01F10/3286 OR H01F10/123 OR H01F10/3254 OR H01F10/3272 OR H01F10/329 OR H01F10/3295 OR H01F10/30 OR H01F41/0206 OR H01F10/12 OR H01F10/3218 OR H01F10/324 OR H01F41/18 OR H01F41/30 OR H01F41/302 OR H01F41/303 OR H01F41/305 OR H01F41/32 OR Y10T428/115 OR Y10T29/4902 OR Y10T29/49032 OR Y10T29/49067 OR Y10T428/12458 OR Y10T428/12465 OR Y10T428/12931 OR Y10T428/26 OR Y10T428/265 OR Y10T156/10 OR Y10T29/49021 OR Y10T29/49043 OR Y10T29/49044 OR Y10T29/49048 OR Y10T29/49052 OR Y10T428/11 OR Y10T428/1107 OR Y10T428/1114 OR Y10T428/1121 OR Y10T428/1143 OR Y10T428/24273 OR Y10T428/315 OR Y10T83/04).CPC.)	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:01
S75	9	S73 and ((varies\$5 or vary\$6 or gradient\$5 or gradual\$5 or variat\$5) near15 (anisotrop\$5 near3 ("k" or constant\$5)))	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:02
S76	57	S74 and ((varies\$5 or vary\$6 or gradient\$5 or gradual\$5 or variat\$5) near15 (anisotrop\$5 near3 ("k" or constant\$5)))	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:02
S77	153	S74 and (exchange\$5 near3 spring\$5)	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/22 18:11

EAST Search History

S78	12	((("SUESS") near3 ("Dieter"))).INV.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	ON	2019/10/24 15:36
S79	114	(428/827,828,828.1,829).ccls. and ("I10" or I1o or "I1.sub.o" or "I1.sub.0" or "I.sub.10" or "I.sub.1o")	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/25 15:10
S80	406	(428/8\$).ccls. and ("I10" or I1o or "I1.sub.o" or "I1.sub.0" or "I.sub.10" or "I.sub.1o")	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/25 15:24
S81	2	"20070026262"	US-PGPUB; USPAT; USOCR	ADJ	ON	2019/10/25 15:32
S82	18	("2007/0026262").URPN.	USPAT	ADJ	ON	2019/10/25 15:33

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S61	4074	(coercivity or (coerciv\$4 near5 (field for force)) or hc\$3 or "h.sub.c"\$5) same (magnet\$5 or ferro\$5magnet\$5).clm.	US-PGPUB; USPAT	ADJ	ON	2017/10/02 15:34
S62	11352	((gradient or gradual\$5 or increas\$5 or decreas\$5) same (anisotrop\$5 or anisotrop\$5 near5 constant\$5 or ku or ku\$2 or "ku.sub."\$2 or k!)).clm.	US-PGPUB; USPAT	ADJ	ON	2017/10/02 15:37
S63	39	S61 and S62	US-PGPUB; USPAT	ADJ	ON	2017/10/02 15:37
S64	81	grad\$4 near3 anisotrop\$5.clm.	US-PGPUB; USPAT	ADJ	ON	2017/10/02 15:53
S65	38	S64 and (magnet\$5 or ferro\$5magnet\$5).clm.	US-PGPUB; USPAT	ADJ	ON	2017/10/02 15:54
S66	418	exchange\$5 near4 spring.clm.	US-PGPUB; USPAT	ADJ	ON	2017/10/02 15:55
S67	10	S61 and S66	US-PGPUB; USPAT	ADJ	ON	2017/10/02 15:56

10/ 25/ 2019 5:55:58 PM

C:\Users\lchau5\Documents\EAST\Workspaces\12619849\12619849.wsp

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 15/925,749			
APPLICATION AS FILED - PART I									
(Column 1)		(Column 2)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY			
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)		
BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A	75		N/A			
SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A	330		N/A			
EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A	380		N/A			
TOTAL CLAIMS <small>(37 CFR 1.16(j))</small>	24 minus 20 =	*	x 50 =	200	OR				
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	3 minus 3 =	*	x 230 =	0.00					
APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$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					
			TOTAL	985		TOTAL			
* If the difference in column 1 is less than zero, enter "0" in column 2.									
APPLICATION AS AMENDED - PART II									
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
	Total <small>(37 CFR 1.16(i))</small>	*	Minus **	=	x =		x =		
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus ***	=	x =		x =		
	Application Size Fee (37 CFR 1.16(s))								
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
			TOTAL ADD'L FEE			TOTAL ADD'L FEE			
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY	
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
	Total <small>(37 CFR 1.16(i))</small>	*	Minus **	=	x =		x =		
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus ***	=	x =		x =		
	Application Size Fee (37 CFR 1.16(s))								
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
			TOTAL ADD'L FEE			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	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/925,749	03/19/2018	Dieter Suess	SUSP02US2

CONFIRMATION NO. 8424

INFORMAL NOTICE



OC000000103918537

Date Mailed: 11/20/2018

143793
Gergely T. Zimanyi
11 Dartmouth Drive
Berkeley, CA 94705

INFORMATIONAL NOTICE TO APPLICANT

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

The item(s) indicated below are also required and should be submitted with any reply to this notice to avoid further processing delays.

- A properly executed inventor's oath or declaration has not been received for the following inventor(s):
Dieter Suess

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/sareebuddin/



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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
15/925,749	03/19/2018	1785	1065	SUSP02US2	24	3

CONFIRMATION NO. 8424

UPDATED FILING RECEIPT



0000000103918338

143793
Gergely T. Zimanyi
11 Dartmouth Drive
Berkeley, CA 94705

Date Mailed: 11/20/2018

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

Inventor(s)

Dieter Suess, Herzogenburg, AUSTRIA;

Applicant(s)

Dieter Suess, Herzogenburg, AUSTRIA;

Power of Attorney: None**Domestic Priority data as claimed by applicant**

This application is a CON of 12/619,849 11/17/2009 PAT 9928864
which is a DIV of 11/424,859 06/17/2006 PAT 9978413

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes**Permission to Access Search Results:** Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 04/16/2018

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/925,749**

page 1 of 3

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

MULTILAYER EXCHANGE SPRING RECORDING MEDIA

Preliminary Class

428

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

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

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

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Title 35, United States Code, Section 184
Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

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

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

NOT GRANTED

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

SelectUSA

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 U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor:	Dieter SUESS	Examiner:	Not yet assigned
Appln. No.:	15/925,749	Art Unit:	1785
Filing Date:	03/19/2018	Confirmation No.:	8424
		Docket No.:	SUSP02US2
		Customer No.:	143793
		Date:	11/18/2018

Title: MULTILAYER EXCHANGE SPRING RECORDING MEDIA

Mail Stop Missing Parts

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

RESPONSE TO NOTICE TO FILE MISSING PARTS

In response to the Notice to File Missing Parts of Nonprovisional Application dated 04/18/2018, filed herewith are the following fees to complete the filing of this application.

Applicants hereby claim small entity status.

The following <u>small entity</u> fees have been paid via EFS.	
Surcharge - Late Submission of Oath/Declaration	\$80.00
Fifth-month Extension Fee	\$1,500.00
TOTAL	\$1,580.0

Respectfully submitted,

Date: 11/18/2018

/Gergely T. Zimanyi/
 Gergely T. Zimanyi, Ph.D.
 Registration No. 45,754

CERTIFICATE OF TRANSMISSION UNDER 37 CFR 1.8	
I hereby certify that this correspondence is being transmitted to the USPTO via EFS-Web on 11/18/2018.	
<u>/Richard A. Pask/</u>	<u>11/18/2018</u>
Richard A. Pask	Date

Gergely T. Zimanyi
 11 Dartmouth Drive
 Berkeley, CA 94745
 Telephone: 530-400-3936
 Email: gzimanyi@gmail.com

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)		Docket Number (Optional) SUSP02US2																																						
Application Number 15/925,749	Filed 03/19/2018																																							
For MULTILAYER EXCHANGE SPRING RECORDING MEDIA																																								
Art Unit 1785	Examiner Not yet assigned																																							
<p>This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application.</p> <p>The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):</p> <table style="width: 100%; border-collapse: collapse;"><thead><tr><th></th><th style="text-align: center;"><u>Fee</u></th><th style="text-align: center;"><u>Small Entity Fee</u></th><th style="text-align: center;"><u>Micro Entity Fee</u></th><th></th></tr></thead><tbody><tr><td>☐ One month (37 CFR 1.17(a)(1))</td><td style="text-align: center;">\$200</td><td style="text-align: center;">\$100</td><td style="text-align: center;">\$50</td><td>\$ _____</td></tr><tr><td>☐ Two months (37 CFR 1.17(a)(2))</td><td style="text-align: center;">\$600</td><td style="text-align: center;">\$300</td><td style="text-align: center;">\$150</td><td>\$ _____</td></tr><tr><td>☐ Three months (37 CFR 1.17(a)(3))</td><td style="text-align: center;">\$1,400</td><td style="text-align: center;">\$700</td><td style="text-align: center;">\$350</td><td>\$ _____</td></tr><tr><td>☐ Four months (37 CFR 1.17(a)(4))</td><td style="text-align: center;">\$2,200</td><td style="text-align: center;">\$1,100</td><td style="text-align: center;">\$550</td><td>\$ _____</td></tr><tr><td>☒ Five months (37 CFR 1.17(a)(5))</td><td style="text-align: center;">\$3,000</td><td style="text-align: center;">\$1,500</td><td style="text-align: center;">\$750</td><td>\$ <u>1,500</u></td></tr></tbody></table> <p>☒ Applicant asserts small entity status. See 37 CFR 1.27.</p> <p>☐ Applicant certifies micro entity status. See 37 CFR 1.29. Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.</p> <p>☐ A check in the amount of the fee is enclosed.</p> <p>☐ Payment by credit card. Form PTO-2038 is attached.</p> <p>☐ The Director has already been authorized to charge fees in this application to a Deposit Account.</p> <p>☐ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number _____.</p> <p>☒ Payment made via EFS-Web.</p> <p>WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.</p> <p>I am the</p> <p>☐ applicant.</p> <p>☒ attorney or agent of record. Registration number <u>45,754</u>.</p> <p>☐ attorney or agent acting under 37 CFR 1.34. Registration number _____.</p> <table style="width: 100%; border-collapse: collapse;"><tr><td style="width: 50%; border-bottom: 1px solid black; padding-bottom: 5px;">/Gergely T. Zimanyi/</td><td style="width: 50%; border-bottom: 1px solid black; padding-bottom: 5px;">11/18/2018</td></tr><tr><td style="text-align: center; font-size: small;">Signature</td><td style="text-align: center; font-size: small;">Date</td></tr><tr><td style="border-bottom: 1px solid black; padding-bottom: 5px;">Gergely T. Zimanyi</td><td style="border-bottom: 1px solid black; padding-bottom: 5px;">530-400-3936</td></tr><tr><td style="text-align: center; font-size: small;">Typed or printed name</td><td style="text-align: center; font-size: small;">Telephone Number</td></tr></table> <p>NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.</p>				<u>Fee</u>	<u>Small Entity Fee</u>	<u>Micro Entity Fee</u>		☐ One month (37 CFR 1.17(a)(1))	\$200	\$100	\$50	\$ _____	☐ Two months (37 CFR 1.17(a)(2))	\$600	\$300	\$150	\$ _____	☐ Three months (37 CFR 1.17(a)(3))	\$1,400	\$700	\$350	\$ _____	☐ Four months (37 CFR 1.17(a)(4))	\$2,200	\$1,100	\$550	\$ _____	☒ Five months (37 CFR 1.17(a)(5))	\$3,000	\$1,500	\$750	\$ <u>1,500</u>	/Gergely T. Zimanyi/	11/18/2018	Signature	Date	Gergely T. Zimanyi	530-400-3936	Typed or printed name	Telephone Number
	<u>Fee</u>	<u>Small Entity Fee</u>	<u>Micro Entity Fee</u>																																					
☐ One month (37 CFR 1.17(a)(1))	\$200	\$100	\$50	\$ _____																																				
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☒ Five months (37 CFR 1.17(a)(5))	\$3,000	\$1,500	\$750	\$ <u>1,500</u>																																				
/Gergely T. Zimanyi/	11/18/2018																																							
Signature	Date																																							
Gergely T. Zimanyi	530-400-3936																																							
Typed or printed name	Telephone Number																																							

☒ * Total of <u>1</u> forms are submitted.
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This collection of information is required by 37 CFR 1.136(a). 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 6 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.

Electronic Patent Application Fee Transmittal				
Application Number:		15925749		
Filing Date:		19-Mar-2018		
Title of Invention:		MULTILAYER EXCHANGE SPRING RECORDING MEDIA		
First Named Inventor/Applicant Name:		Dieter Suess		
Filer:		Gergely T. Zimanyi/Richard Pask		
Attorney Docket Number:		SUSP02US2		
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
LATE FILING FEE FOR OATH OR DECLARATION	2051	1	80	80
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Extension - 5 months with \$0 paid	2255	1	1500	1500
Miscellaneous:				
Total in USD (\$)				1580

Electronic Acknowledgement Receipt	
EFS ID:	34341448
Application Number:	15925749
International Application Number:	
Confirmation Number:	8424
Title of Invention:	MULTILAYER EXCHANGE SPRING RECORDING MEDIA
First Named Inventor/Applicant Name:	Dieter Suess
Customer Number:	143793
Filer:	Gergely T. Zimanyi/Richard Pask
Filer Authorized By:	Gergely T. Zimanyi
Attorney Docket Number:	SUSP02US2
Receipt Date:	18-NOV-2018
Filing Date:	19-MAR-2018
Time Stamp:	21:29:44
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 1580
RAM confirmation Number	111918INTEFSW21340300
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	Applicant Response to Pre-Exam Formalities Notice	1_SUSP02US2_Response_to_Missing_Parts_Fees.pdf	373467	no	1
			f70e4bebe92f31534275dafd55238df0d4dde9a		
Warnings:					
Information:					
2	Extension of Time	2_SUSP02US2_EOT.pdf	421467	no	1
			7d72bfa4ed03ded22f2504c9c55e8318c1afc08d		
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	32384	no	2
			66d133cedee3b93cbb5a6c3df4fbc5b9eb5e12be4		
Warnings:					
Information:					
Total Files Size (in bytes):			827318		
<p>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.</p> <p><u>New Applications Under 35 U.S.C. 111</u> 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.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> 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.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> 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.</p>					



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United States Patent and Trademark Office
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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/925,749	03/19/2018	Dieter Suess	SUSP02US2

CONFIRMATION NO. 8424

PUBLICATION NOTICE



OC000000101267396

143793
Gergely T. Zimanyi
11 Dartmouth Drive
Berkeley, CA 94705

Title:MULTILAYER EXCHANGE SPRING RECORDING MEDIA

Publication No.US-2018-0211689-A1

Publication Date:07/26/2018

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

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COMMISSIONER FOR PATENTS
P.O.BOX 1450
ALEXANDRIA VA 22313-1451

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Gergely T. Zimanyi
11 Dartmouth Drive
Berkeley, CA 94705



**Courtesy Reminder for
Application Serial No: 15/925,749**

Attorney Docket No: SUSP02US2

Customer Number: 143793

Date of Electronic Notification: 04/18/2018

This is a courtesy reminder that new correspondence is available for this application. If you have not done so already, please review the correspondence. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

An email notification regarding the correspondence was sent to the following email address(es) associated with your customer number:

gzimanyi@gmail.com

richepask@gmail.com

To view your correspondence online or update your email addresses, please visit us anytime at **<https://sportal.uspto.gov/secure/myportal/privatepair>**. If you have any questions, please email the Electronic Business Center (EBC) at **EBC@uspto.gov** or call 1-866-217-9197.



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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/925,749	03/19/2018	Dieter Suess	SUSP02US2

CONFIRMATION NO. 8424

FORMALITIES LETTER

143793
Gergely T. Zimanyi
11 Dartmouth Drive
Berkeley, CA 94705



Date Mailed: 04/18/2018

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing.

Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- Surcharge as set forth in 37 CFR 1.16(f) must be submitted.
The surcharge is due for any one of:
 - late submission of the basic filing fee, search fee, or examination fee,
 - late submission of inventor's oath or declaration,
 - filing an application that does not contain at least one claim on filing, or
 - submission of an application filed by reference to a previously filed application.

SUMMARY OF FEES DUE:

The fee(s) required within **TWO MONTHS** from the date of this Notice to avoid abandonment is/are itemized below. Small entity discount is in effect. If applicant is qualified for micro entity status, an acceptable Certification of Micro Entity Status must be submitted to establish micro entity status. (See 37 CFR 1.29 and forms PTO/SB/15A and 15B.)

- \$ **80** surcharge.
- \$(**0**) previous unapplied payment amount.
- \$ **80** TOTAL FEE BALANCE DUE.

Items Required To Avoid Processing Delays:

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

- A properly executed inventor's oath or declaration has not been received for the following inventor(s):

page 1 of 2

Dieter Suess

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web, including a copy of this Notice and selecting the document description "Applicant response to Pre-Exam Formalities Notice".
<https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html>

For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at <http://www.uspto.gov/ebc>.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/kgebremichael/

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 15/925,749			
APPLICATION AS FILED - PART I									
(Column 1)		(Column 2)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY			
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)		
BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A	75		N/A			
SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A	330		N/A			
EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A	380		N/A			
TOTAL CLAIMS <small>(37 CFR 1.16(j))</small>	24	minus 20 = *	4	x 50 =	200	OR			
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	3	minus 3 = *		x 230 =	0.00				
APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$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				
			TOTAL	985		TOTAL			
* If the difference in column 1 is less than zero, enter "0" in column 2.									
APPLICATION AS AMENDED - PART II									
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
	Total <small>(37 CFR 1.16(i))</small>	*	Minus	**	=		x	=	
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus	***	=		x	=	
	Application Size Fee (37 CFR 1.16(s))								
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
			TOTAL ADD'L FEE			OR	TOTAL ADD'L FEE		
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
	Total <small>(37 CFR 1.16(i))</small>	*	Minus	**	=		x	=	
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus	***	=		x	=	
	Application Size Fee (37 CFR 1.16(s))								
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
			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
15/925,749	03/19/2018	2688	985	SUSP02US2	24	3

CONFIRMATION NO. 8424

FILING RECEIPT



000000098519853

143793
Gergely T. Zimanyi
11 Dartmouth Drive
Berkeley, CA 94705

Date Mailed: 04/18/2018

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

Inventor(s)

Dieter Suess, Herzogenburg, AUSTRIA;

Applicant(s)

Dieter Suess, Herzogenburg, AUSTRIA;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 12/619,849 11/17/2009 PAT 9928864
which is a DIV of 11/424,859 06/17/2006

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

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Projected Publication Date: 07/26/2018

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

MULTILAYER EXCHANGE SPRING RECORDING MEDIA

Preliminary Class

360

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

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UTILITY PATENT APPLICATION TRANSMITTAL <small>(Only for new nonprovisional applications under 37 CFR 1.53(l))</small>		Attorney Docket No. SUSP02US2	
		First Named Inventor Dieter Suess	
		Title Multilayer Exchange Spring Recording Media	
		Priority Mail Express® Label No.	

APPLICATION ELEMENTS <small>See MPEP chapter 600 concerning utility patent application contents.</small>	ADDRESS TO: Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450
<ol style="list-style-type: none"> 1. ☒ Fee Transmittal Form (PTO/SB/17 or equivalent) 2. ☒ Applicant asserts small entity status. <small>See 37 CFR 1.27</small> 3. ☐ Applicant certifies micro entity status. See 37 CFR 1.29. <small>Applicant must attach form PTO/SB/15A or B or equivalent.</small> 4. ☒ Specification {Total Pages <u>20</u>} <small>Both the claims and abstract must start on a new page. (See MPEP § 608.01(a) for information on the preferred arrangement)</small> 5. ☒ Drawing(s) (35 U.S.C. 113) {Total Sheets <u>6</u>} 6. ☒ Inventor's Oath or Declaration {Total Pages _____} <small>(including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e))</small> <ol style="list-style-type: none"> a. ☐ Newly executed (original or copy) b. ☐ A copy from a prior application (37 CFR 1.63(d)) 7. ☒ Application Data Sheet * See note below. <small>See 37 CFR 1.76 (PTO/AIA/14 or equivalent)</small> 8. CD-ROM or CD-R <small>in duplicate, large table, or Computer Program (Appendix)</small> <div style="margin-left: 20px;"> ☐ Landscape Table on CD </div> 9. Nucleotide and/or Amino Acid Sequence Submission <small>(if applicable, items a. - c. are required)</small> <ol style="list-style-type: none"> a. ☐ Computer Readable Form (CRF) b. ☐ Specification Sequence Listing on: <ol style="list-style-type: none"> i. ☐ CD-ROM or CD-R (2 copies); or ii. ☐ Paper c. ☐ Statements verifying identity of above copies 	ACCOMPANYING APPLICATION PAPERS <ol style="list-style-type: none"> 10. ☐ Assignment Papers <small>(cover sheet & document(s))</small> Name of Assignee _____ 11. ☐ 37 CFR 3.73(c) Statement ☐ Power of Attorney <small>(when there is an assignee)</small> 12. ☐ English Translation Document <small>(if applicable)</small> 13. ☐ Information Disclosure Statement <small>(PTO/SB/08 or PTO-1449)</small> <div style="margin-left: 20px;">☐ Copies of citations attached</div> 14. ☐ Preliminary Amendment 15. ☐ Return Receipt Postcard <small>(MPEP § 503) (Should be specifically itemized)</small> 16. ☐ Certified Copy of Priority Document(s) <small>(if foreign priority is claimed)</small> 17. ☐ Nonpublication Request <small>Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.</small> 18. ☐ Other: _____ _____ _____ _____

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☒ Applicant asserts small entity status. See 37 CFR 1.27. ☐ Applicant certifies micro entity status. See 37 CFR 1.29. Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.	Application Number	Not yet assigned
	Filing Date	Herewith
	First Named Inventor	Dieter Suess
	Examiner Name	Not yet assigned
	Art Unit	Not yet assigned
TOTAL AMOUNT OF PAYMENT	(\$)	985.00
	Practitioner Docket No.	SUSP02US2

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Application Type	FILING FEES			SEARCH FEES			EXAMINATION FEES			Fees Paid (\$)
	U (\$)	S (\$)	M (\$)	U (\$)	S (\$)	M (\$)	U (\$)	S (\$)	M (\$)	
Utility	300	150*	75	660	330	165	760	380	190	785
Design	200	100	50	160	80	40	600	300	150	
Plant	200	100	50	420	210	105	620	310	155	
Reissue	300	150	75	660	330	165	2,200	1,100	550	
Provisional	280	140	70	0	0	0	0	0	0	

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2. EXCESS CLAIM FEES

Fee Description	Undiscounted Fee (\$)	Small Entity Fee (\$)	Micro Entity Fee (\$)
Each claim over 20 (including Reissues)	100	50	25
Each independent claim over 3 (including Reissues)	460	230	115
Multiple dependent claims	820	410	205
Total Claims			
24 - 20 or HP = 4	400	200	100
HP = highest number of total claims paid for, if greater than 20.			
Indep. Claims			
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Signature	/Gergely T. Zimanyi/	Registration No. (Attorney/Agent)	45,754	Telephone	530-400-3936
Name (Print/Type)	Gergely T. Zimanyi			Date	03/19/2018

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Multilayer Exchange Spring Recording Media

Dieter Suess

BACKGROUND

Field of Invention

[0001] This invention relates generally to magnetic recording media, and more particularly to thermally stable high density media.

Description of Related Art

[0002] Modern magnetic recording media reaches ever higher recording densities. Further increase of the areal density is believed to be limited by the superparamagnetic limit. This limit represents that as the size of the magnetic grains in the media decrease, at some grain size the thermal fluctuations at room temperature $k_B T_{300}$ become capable of overcoming the energy barrier $\Delta E = KV$, which separates the two magnetization directions of an isolated grain with a volume V and an uniaxial anisotropy constant K . This superparamagnetic limit, or thermal instability, can be overcome by increasing the anisotropy K , according to the Stoner-Wohlfarth theory. However, such an increase also results in an unfavourable increase of the coercivity H_c . As a consequence, these grains are thermally stable but can not be written with existing recording heads.

[0003] Various improvements have been proposed to counter this thermal instability recently, also known as the writeability problem. In US patent No.: 6,468,670 a continuous ferromagnetic overlayer was introduced to increase the Signal to Noise Ratio (SNR). US patent No.: 6,280,813 and US patent No.: 6,383,668 addressed the thermal instability problem by replacing the conventional single magnetic recording layer with two ferromagnetic films that are antiferromagnetically coupled together across a nonferromagnetic spacer film, and a ferromagnetic layer that is coupled to a synthetic antiferromagnet, respectively. This idea reduces the demagnetizing field of the bits in the case of longitudinal magnetic recording. U.S. Pat. No. 5,583,727 proposed to overcome the problem by employing thermally assisted recording. In the paper "FeRh/FePt exchange spring films for thermally assisted magnetic

recording media" Applied Physics Letters, Vol. 82, Issue 17, April 2003, pp. 2859-2861, Thiele *et al.* suggested to lower the coercive field by the use of FePt/FeRh bilayer system. The proposed architecture included a hard layer, exchange coupled to an antiferromagnetic layer. After heating the antiferromagnetic layer across a transition temperature, it became ferromagnetic with a large magnetic moment and low magnetocrystalline anisotropy. Thus, upon crossing the transition temperature the antiferromagnetic layer acted as a magnetic soft layer that helped to reverse the hard layer.

[0004] In the paper "Composite Media for Perpendicular Magnetic Recording", IEEE Transactions on Magnetics, Vol. 41, No. 2, February 2005, pp. 537-542, R. H. Victora and X. Shen proposed magnetic multilayer structures composed of magnetically hard and magnetically soft layers. In the model of Victora and Shen, the magnetization of the soft and the hard part of each grain remained uniform. In order to decrease the coercive field, the exchange coupling between these layers had to be reduced with a decoupling layer. Motivated by the theoretical work, Wang *et al.* performed an experimental work on two layer composite media. The results were reported in "Composite media (dynamic tilted) media for magnetic recording", Applied Physics Letters, Vol. 86, April 2005, pp. 142504. Wang *et al.* concluded that a coupling layer was required in composite media to decrease the exchange coupling between the soft and hard layer, in accordance with the theory. This was in contrast to the paper "Exchange spring media for perpendicular recording," Applied Physics Letters, Vol. 87, July 2005, pp. 12504-12507 by Suess *et al.*, incorporated herein by reference in its entirety, where states with inhomogeneous magnetization were formed.

[0005] The paper "Preliminary Study on (CoPtCr/NiFe)-SiO₂ Hard/Soft-Stacked Perpendicular Recording Media", IEEE Transactions on Magnetics, Vol. 41, No. 10, October 2005, pp. 3136, Y. Inaba *et al.* considered a sufficiently thin soft magnet coupled to a sufficiently thin hard magnet in order to keep the magnetization uniform and parallel in both layers during reversal. The paper "Exchange spring recording media for areal densities up to 10 Tbit/in²", Journal of Magnetism and Magnetic Materials, Vol. 290-291, 2005, pp. 551-554 (available online 18 December 2004) by Suess *et al.*, incorporated herein by reference in its entirety, proposed a tri-layer structure which was composed of a hard layer at bottom, a soft layer in the middle and a hard layer on top.

[0006] The paper "Exchange spring media for perpendicular recording," Applied Physics Letters, vol. 87, 30. June 2005, pp. 012504, by Suess *et al.*, incorporated herein by reference

in its entirety, domain wall assisted recording on bilayers was presented. Subsequent work by A. Dobin and H. J. Richter (presented at the Intermag conference 2006, talk DB-10, San Diego, CA, May 2006; preprint available at <http://arxiv.org> "Domain Wall Assisted Magnetic Recording" by Dobin and Richter) followed the same approach.

[0007] In previous works it was not shown that a finite value of the anisotropy in the soft magnetic layer does not reduce the thermal stability of the structure. This question needs to be investigated, as larger anisotropies in the softer layer reduce the energy that is required to push a domain wall from the soft layer to the hard layer. Further, typical multilayer exchange spring media do not even contain a soft magnetic layer. Instead, it contains a nucleation layer which can be magnetically hard. The softest layer in the nucleation layer can have a coercive field similar to typical fields of recording heads.

For all these reasons, the choice of layer architectures and their anisotropies to overcome the superparamagnetic limit in optimal fashion remain a topic of intense investigations.

SUMMARY

[0008] Briefly and generally, embodiments according to the invention include a magnetic recording media wherein the magnetic recording layer consists of a multilayer structure, with a special multilayer host layer (nucleation host) and a hard magnetic storage layer ($H_c > 2$ T). The anisotropy of the softest layer in the nucleation host is significantly smaller than in the hard layer. In some embodiments the ratio of anisotropies can reach a factor of 2. During writing a domain wall is formed in the nucleation host that propagates through the whole grain structure and finally reverses the hard magnetic storage layer. The nucleation host significantly decreases the coercive field of each grain of the proposed media but has only little influence on the thermal stability. In some embodiments the host layer comprises of just one layer, the media is a bilayer structure with one hard magnetic nucleation host and an even harder storage layer. In embodiments, where the host layer comprises more than one layer the anisotropy increases from one layer to the next layer. The layers can be strongly exchange coupled. The exchange coupling can be direct or via a thin coupling layer in order to achieve strong coupling. If the layers are strongly coupled a domain wall is formed across the hard/soft interface during reversal.

[0009] In embodiments with a nucleation host having the same magnetization as the hard

magnetic storage layer and consisting only of one layer, the coercive field can be reduced by a factor of up to five compared to the coercive field of the hard magnetic storage layer without the nucleation host at the same thermal stability.

[0010] In embodiments, where the nucleation host has an exchange constant and magnetic polarization in the nucleation host larger than in the hard magnetic storage layer, the reduction of the coercive field can be even larger than a factor of five.

[0011] The coercive field can also be increased by increasing the number of layers in the nucleation host. In embodiments with two or three layers in the nucleation host, the coercive field is reduced by a factor of up to 9 and 13, compared to the coercive field of the hard magnetic storage layer without the nucleation host.

[0012] In other embodiments further increase of the coercive field is reached by increasing the anisotropy continuously. For a 25 nm thick layer with quadratically increasing anisotropy and a maximum value of $K_1 = 2\text{MJ/m}^3$ in the nucleation host the coercive field is smaller by a factor of 10 compared to a layer consisting of a material with $K_1 = 2\text{MJ/m}^3$, while, remarkably, the thermal stability of these two architectures is substantially the same.

[0013] Embodiments also show a characteristic dependence of the coercive field on the angle between the external field and the easy axis of the hard layer. In contrast to single phase recording media that shows a Stoner-Wohlfarth like switching field dependence as a function of the external field angle, exchange spring media behave more like "pinning magnets". In pinning permanent magnets a high coercive field can be achieved by the introduction of pinning centres, such as soft magnetic inclusions or non magnetic inclusions that trap a domain wall and hence hinder the domain wall from propagating through the whole magnet. Therefore, the reversal of the magnetization due to domain wall motion is stopped by the pinning centres. Typically, in pinning magnets the dependence of the coercive field as a function of the angle α between the external field and the easy axis can be described by, $H_c = 1 / \cos(\alpha)$. That implies that for small angles between the external field and the easy axis the switching field is less sensitive to the easy axis distribution. This makes exchange spring media also a potential candidate for patterned media since the switching field distribution due to an easy axis distribution is reduced.

[0014] Generally, the above embodiments provide marked improvement against the superparamagnetic limit as the coercive field is reduced by the spatially varying anisotropy in

the nucleation host, while the thermal stability is determined only by the domain wall energy in the hardest magnetic storage layer, which is not influenced by the variations of the anisotropy of the nucleation host.

[0015] This is achieved because the new architecture removes the proportionality of the energy barrier to the coercive field. In some cases the coercive field can be inversely proportional to the layer thickness while the energy barrier remains independent of it. Therefore, with these new architectures embodiments overcome the writeability problem of extremely hard magnetic storage layers with high thermal stability.

BRIEF DESCRIPTION OF DRAWINGS

[0016] FIG. 1 is a schematic sectional view of a magnetic recording disk with a multilayer exchange spring recording media.

[0017] FIG. 2 shows a hysteresis loop in some embodiments. For comparison, the hysteresis loop of a conventional single phase grain is shown.

[0018] FIG. 3 shows the coercive field as a function of the angle between the easy axis and external field for bilayers with different values of the anisotropy in the softest layer in the nucleation host.

[0019] FIG. 4 shows the hysteresis loop of different exchange spring films comprising of 14 x 14 grains.

[0020] FIG. 5 illustrates the reduction of the coercive field for a nucleation host with a continuously increasing anisotropy.

[0021] FIG. 6 shows the energy barrier as a function of the hard layer thickness.

DETAILED DESCRIPTION

[0022] FIG. 1 illustrates the cross sectional view of the layer structure of an existing disk of recording medium. The disk includes a substrate 5, a soft magnetic underlayer 7, an interlayer 9, an optional seed layer 11a and underlayer 11b, a hard magnetic storage layer 24, strongly exchange coupled to a nucleation layer 21, an optional coupling layer 22, a protective

layer 28a, and a lubricant layer 28b. Although the hard magnetic storage layer is shown on top of the nucleation layer, the order of the layers can also be reversed.

[0023] Substrate 5 may be made of any suitable material such as ceramic glass, amorphous glass, or NiP plated AlMg or an AlMg alloy base with a NiP surface coating.

[0024] Soft magnetic underlayer 7 is deposited on substrate 5. soft magnetic underlayer 7 may be made of any suitable material such as NiFe, CoNbB, FeAlSi, CoFeB, FeTa₂N, FeTaC, FeCoB, FeSiO₂, FeAlSi, FeTa₂N, FeN, CoFe, CoZr, CoFeB, CoZrNb, NiFeNb or equivalents. Soft magnetic underlayer 7 may have a thickness in the range of about 50 nm to about 500 nm.

[0025] Interlayer 9 maybe important for the grain structure of the hard magnetic recording media. Interlayer 9 maybe any suitable material such as Pt, Ge, Si, CoCr, SiO₂, Au, Al, CoZr, Ta, Ti, TiCr, Ru, RuCrCo, TiZr, or equivalents.

[0026] Optional seed layer 11a maybe used in order to improve the growth of underlayer 11b. Optional seed layer 11a may be formed of a suitable material of hcp, fcc, bcc or even amorphous structure. It provides a smooth wetted surface for the subsequent growth of underlayer 11b.

[0027] Underlayer 11b is deposited onto optional seed layer 11a, if present, or otherwise directly onto substrate 5. Underlayer 11b may be formed of a suitable hcp material with a lattice parameter close to the alloys of the first layer in the magnetic layer. These alloys may be, for example, Ru-based alloys, Re-based alloys or Pd based alloys. Underlayer 11b may have a thickness in the range of about 1 nm to about 20 nm. Other thicknesses can also be used.

[0028] The recording media includes hard magnetic storage layer 24 and softer nucleation host 21. Hard magnetic storage layer 24 can be a ferromagnet, ferrimagnet, antiferromagnet, or any other synthetic antiferromagnetic structure. The coupling between the nucleation host and the hard magnetic storage layer may be ferromagnetic or antiferromagnetic. Hard magnetic storage layer 24 maybe formed from any material that has large perpendicular anisotropy. These materials include tetragonal; L1₀-ordered phase materials, CoPt and FePt based alloys, CoPtCr alloys, including CoPtCrB, CoPtCrTa, and CoCr based granular media. Other high anisotropy materials suitable for the recording layer 16 include pseudo-binary

alloys based on the FePt and CoPt L_{10} phase, i.e., FePt--X and CoPt--X, where the element X may be Ni, Au, Cu, Pd or Ag, as well as granular composite materials such as FePt--C, FePt--ZrO, FePt--MgO, FePt--B₂O₃, materials containing at least one of B, Cu, Ag, W, Mo, Ru, Si, Ge, Nb, Pd, Sm, Nd, Dy, Hf, Mn, Ni and other similar composites.

[0029] In some embodiments the thickness of hard magnetic storage layer 24 is between 3 nm and 30 nm. In other architectures it can be outside these ranges. In embodiments where the anisotropy of nucleation host 21 is continuously increased, hard magnetic storage layer 24 is optional.

[0030] In some embodiments nucleation host 21 can be formed on hard magnetic storage layer 24. In other embodiments the order is changed so that hard magnetic storage layer 24 is deposited on nucleation host 24. Nucleation host can be formed as a granular or a continuous film. The exchange coupling between hard magnetic storage layer 24 and nucleation host 21 can be sufficiently strong to enable the formation of a domain wall across the interface of these layers during reversal.

[0031] Any of the materials, listed for hard magnetic storage layer 24 can be also used for forming nucleation host 21. In some embodiments a magnetic material is referred to as "hard" if its coercive field $H_c > 0.5$ T, and "soft" if its coercive field is $H_c < 0.5$ T. In some embodiments these terms are defined in a relative sense: the coercive field of (soft) nucleation host 21 can be half of the coercive field of hard magnetic storage layer 24. In other embodiments this ratio can be different. In some embodiments a layer is referred to as "hard", if $\Delta k_{\max} / k_{\min} < 0.5$. The definition of the terms in this inequality will be given below.

[0032] In some embodiments the grains of nucleation host 21 are aligned with the grains of hard magnetic storage layer 24, as shown in FIG. 1. In some embodiments this alignment is only approximate. These embodiments are sometimes called columnar media.

[0033] In some embodiments nucleation host 21 and hard magnetic storage layer 24 are in direct contact. In other embodiments, they are separated by optional coupling layer 22. Optional coupling layer 22, disposed between hard magnetic storage layer 24 and nucleation host 21, can provide a strong "exchange coupling". Optional coupling layer 22 may enhance the granular growth between hard magnetic storage layer 24 and nucleation host 21. Optional coupling layer 22 may have a thickness between 0.1 nm and 3 nm. Optional coupling layer 22 may provide an exchange constant A in excess of $A = 10^{-14}$ J/m. In conventional

perpendicular recording the exchange constant between grains is small. In exchange spring media both large and small values of the lateral exchange can be useful. For a large value of the lateral exchange in hard magnetic storage layer 24 the transitions of the bits are not necessarily located at the grain boundaries. Instead, domain walls are formed that separate the bits. A large value of the anisotropy of hard magnetic storage layer 24 decreases the domain wall width, so that the transition parameter of the bits may not be significantly larger than 2nm to 3 nm that can be equal to about the grain diameter. In the case of large lateral exchange the domain walls are not pinned at the grain boundary in the hard magnetic storage layer but the domain walls are pinned due to the granular laterally weakly exchange coupled nucleation host. A weak exchange in the hard magnetic storage layer may require a large exchange in the nucleation layer.

[0034] In the following the plane of nucleation host 21 will be identified as the x-y plane. For example, in a magnetic storage disk, the plane of the disk is essentially parallel to the x-y plane of nucleation host 21. The z coordinate then parametrizes the direction of the thickness of nucleation host 21.

[0035] In some embodiments nucleation host 21 contains more than one layer which have different anisotropy K . In other embodiments nucleation host 21 is characterized by a spatially varying anisotropy $K(z)$. In these embodiments, the anisotropy assumes more than one value in a substantial magnetic portion of nucleation host 21. In this sense the embodiments differ from single layer nucleation hosts, whose anisotropy assumes varying values only in an insubstantial portion. This may occur e.g. because of surface effects, in a very thin layer at the surface. Also, the variation is occurring in the magnetic nucleation host 21 itself. In this sense, embodiments differ from disks which have a single layer nucleation host 21 and a spacer layer.

[0036] In some embodiments, the softest, or smallest value of the anisotropy K is half of the anisotropy of hard magnetic storage layer 24. In other embodiments this ratio can be closer to one. This softest value of K is the anisotropy of the softest layer in multilayer embodiments, or the softest value in the spatially varying embodiments.

[0037] In some embodiments the lateral, or nearest neighbor, exchange between the grains of nucleation host 21 is small.

[0038] Protective layer 28a, sometimes called overcoat, is typically diamond-like amorphous

carbon or nitrogenated carbon, but may be any conventional disk overcoat. Overcoat 28a is typically less than 15 nm thick.

[0039] All of the layers described above from seed layer 11 to overcoat 28a can be sputtered in a continuous process in either an in-line sputtering system or a single disk system, such as commercially available single disk systems with multiple sputtering target capacity. The sputter deposition of each of the layers can be accomplished using standard targets and techniques known to those in the field with the modifications described above.

[0040] In the following, some considerations will be provided, which may be relevant for understanding features of the embodiments. Some embodiments combine benefits of softer magnetic layer with that of harder magnetic layers.

[0041] In some embodiments nucleation host 21 includes only one layer. In these embodiments the recording media is referred to as a bilayer, which includes nucleation host 21 and hard magnetic storage layer 24. Under the assumption that both layers remain completely homogeneous, the bilayer structure does not provide any improvements for the writeability compared to a single layer system. This conclusion is different from that of Y. Inaba et al. in the paper "Preliminary Study on (CoPtCr/NiFe)-SiO₂ Hard/Soft-Stacked Perpendicular Recording Media", IEEE Transactions on Magnetics, Vol. 41, No. 10, October 2005, pp. 3136.

[0042] A hard/soft layer structure where the magnetization in the hard and soft layer is parallel and uniform can be described with one average magnetization $M_{eff} = (M_{hard} \times l_{hard} + M_{soft} \times l_{soft}) / (l_{soft} + l_{hard})$ and one average anisotropy constant $K_{eff} = (K_{hard} \times l_{hard} + K_{soft} \times l_{soft}) / (l_{soft} + l_{hard})$. In a simple model the energy barrier can be estimated by $\Delta E = F \times K_{eff} \times (l_{soft} + l_{hard})$, where F is the area of the basal plane of one grain of the media. The coercive field is $H_c = 2 K_{eff} / M_{eff}$. The ratio of the energy barrier to the coercive field, the "ratio barrier" $\Delta E / H_c$ only depends on the value of the average magnetization and the grain volume. Therefore, this bilayer structure leads to the same thermal stability as the single layer structure of the same thickness for the same value of the coercive field and for the same value of the average magnetization.

[0043] In embodiments of the invention, the design of the recording media is capable of supporting the formation of a domain wall during reversal. This magnetic domain wall becomes pinned at hard/soft interfaces. Compared to single phase media with the magnetic

properties of the hard layer, the coercive field in a bilayer structure can be significantly reduced. In embodiment this reduction reaches a factor of four, as described by Loxley et al. in the paper: "Theory of Domain Wall Nucleation in a Two Section Magnetic Wire", IEEE Transactions on Magnetics, Vol. 37, July 2001, pp. 1998 – 2100). However, Loxley et al considered an idealized magnetic wire instead of a magnetic recording medium. A factor of five decrease was shown by Hagedorn in the paper: "Analysis of Exchange-Coupled Magnetic Thin Films," Journal of Applied Physics, Vol. 41, 1970, pp. 2491-2502, when a finite anisotropy in the soft layer was assumed.

[0044] A feature of embodiments of the invention is that the coercive field and the thermal energy barrier can be separately adjusted. In contrast, the above works considered these quantities closely connected and thus not adjustable separately. The thermal energy barrier is primarily determined by the material parameters of hard magnetic storage layer 24, substantially independently from the material parameters of nucleation host 21. Thus, in embodiments the ratio $r = \frac{\Delta E_{thermal}}{\Delta E_{hyst}}$ can be selected in the range of 0.5 to 10. In others the

range can be even broader. Here the thermal energy barrier $\Delta E_{thermal}$ is the energy barrier separating the two magnetic states, which has to be overcome by the thermal fluctuations. The hysteretic energy loss $\Delta E_{hyst} = J_s H_c V$ is the product of grain volume V , the coercive field H_c and the average magnetization J_s , which characterizes the energy to be overcome during a write process. For single domain particles these energy scales are closely connected with a fixed ratio r of 0.5.

[0045] The field, required to overcome the pinning field to push a domain wall from the softer layer to the hard layer depends on the difference between the anisotropy constants of these layers as described by a formula by Hagedorn et al. If the number of layers is increased, this difference can be decreased leading to a reduction of the pinning and coercive field. For example, if the anisotropy of the m -th layer assumes the value $K^m = (m-1)K_{hard}/(N-1)$, the difference between the anisotropy constants of adjacent layers is $K_{hard}/(N-1)$. Such an architecture leads to a coercive field of the whole structure of $H_c = 1/(4N-4) \times 2 K_{hard}/J_s$. Here, K_{hard} is the anisotropy constant of the hardest layer (the hard magnetic storage layer), J_s the magnetic polarization of the structure and N is the number of layers. For sufficiently thick hard magnetic storage layer the thermal stability is given by the domain wall energy in the

hard magnetic storage layer. Importantly, therefore, at zero field the nucleation host does not lower the thermal stability.

[0046] FIG. 2 illustrates the micromagnetic simulations, which were performed to demonstrate the benefit of multilayer exchange spring media. FIG. 2 compares the hysteresis loop of different multilayer exchange spring media with a conventional recording media. Only one grain of the media was modeled. The parameters are for illustrative purposes only and can widely vary in different embodiments. The external field is applied at an angle of 0.5° . Nucleation host 21 is assumed to have a granular structure. The thickness of the entire grain structure is 25 nm. The grain diameter is 5 nm. The magnetization is $M_s = 0.5 \text{ T} / \mu_0$. The grains are formed from a magnetic hard material with $K_1 = 2 \text{ MJ/m}^3$.

[0047] The trace "single phase" illustrates an embodiment in which the grains have a single anisotropy value. The trace "bilayer soft $K_{\text{soft}}=0$ " illustrates an embodiment, where 7 nm of the grain are magnetically extremely hard with $K_{\text{hard}} = 2 \text{ MJ/m}^3$, the other 18 nm are perfectly soft $K_{\text{soft}} = 0$. The trace "bilayer soft $K_{\text{soft}}=0.2 \text{ MJ/m}^3$ " illustrates an embodiment where again 7 nm of the grain is extremely hard $K_{\text{hard}} = 2 \text{ MJ/m}^3$. The softer region has still a relative high anisotropy of $K_{\text{soft}} = 0.2 \text{ MJ/m}^3$. The "trilayer" trace illustrates the embodiment where 7 nm again has $K^1 = K_{\text{hard}} = 2 \text{ MJ/m}^3$, 5.6 nm of the grain has $K^2 = 1.11 \text{ MJ/m}^3$ and 12.4 nm of the grain has $K^3 = 0.22 \text{ MJ/m}^3$.

[0048] Visibly, the coercive field of the bilayer structures is severely reduced from that of the single phase media by a factor of about 4-4.5. The trilayer structure has its coercive field further reduced, by about a factor of 7 compared to the single phase media. The discrepancy to the theoretical limit of 9 can be attributed to the finite layer thickness. The effect of reversible magnetization processes can be observed by the non – rectangular shape of the hysteresis loop.

[0049] Some embodiments have a gradually varying anisotropy $K(z)$ in nucleation host 21. Such embodiments will be referred to as "G-layer". In FIG. 2 the hysteresis loop of G-layers are shown. The trace "continuous strayfield" illustrates the embodiment in which the anisotropy increases quadratically as a function of the z coordinate, the distance from the bottom of the grain: $K(z) \sim z^2$. The demagnetizing field of the grain is taken into account. The trace "continuous" illustrates the embodiment in which the demagnetizing field was omitted. FIG. 2 shows that the coercive field is just 1/10 of the coercive field of the single

layer structure for a thickness of 25 nm. It is also interesting to note that the hysteresis loop is almost perfectly rectangular. If the strayfield is taken into account, the coercive field increases by about 3%, which can be attributed to the additional uniaxial anisotropy caused by the shape anisotropy.

[0050] The variation of $K(z)$ can take many different form. The rise can be linear, or follow any polynomial or other rising function. It can have plateaus or steps, connected by rising segments. It can also have decreasing segments. In some embodiments, the functional form of $K(z)$ is chosen to optimize the switching properties of the recording media, e.g. by increasing the thermal energy barrier while keeping the writing field, or coercive field, essentially unchanged, or even decreasing it.

[0051] FIG. 3 illustrates the angular dependence of the coercive field $H_c(\alpha)$ as a function of the angle α that is measured between the easy axis and the external field. So the coercive field is measured for different angles α . The solid line shows the angular dependence of the trilayer of FIG. 2. The dotted line shows the angular dependence of the coercive field if the anisotropy in the softest layer of the nucleation host is set to zero. In contrast to single phase media, the coercive field does not have a minimum for a field angle of 45° . The pinning force to depin the domain wall at the hard/soft interfaces depends inversely from the cosine of the angle between the easy axis and the external field. It can be seen that the coercive field $H_c(\alpha=20^\circ)$ is smaller than $H_c(\alpha=45^\circ)$. A similar dependence can be found if instead of the coercive field the field $H_m(\alpha)$ is introduced, where H_m is the field that is required to decrease the magnetization of the saturated film ($M_d/M_s=1$) to $M_d/M_s \approx 0.5$. Differences of the field H_m and H_c occur if the media comprises of a thick soft layer with high magnetization.

[0052] FIG. 4 shows the hysteresis loop of an exchange spring perpendicular recording film consisting of 14×14 grains. The parameters of this embodiment are for illustrative purposes only. The average grain diameter is 5nm. The film thickness is 23 nm. The exchange field between the grains is about 0.25T. The thickness of the nucleation layer is equal to the thickness of the hard magnetic storage layer which is 10.5 nm. The two layers are separated by a 2 nm thick optional coupling layer 22. The exchange constant in the coupling layer is varied from $A = 1 \times 10^{-12}$ J/m to the bulk value of the exchange in the nucleation layer and the storage layer which is $A = 1 \times 10^{-11}$ J/m. The hysteresis loops show that with increasing coupling the coercive field decreases. Furthermore the hysteresis curves for $A = 1 \times 10^{-12}$ J/m

and $A = 2 \times 10^{-12}$ J/m show that the slope of the hysteresis loop $k = \frac{dM}{dH} \frac{H_c}{M_s}$ changes in the interval $-0.7 < M/M_s < 0.7$, significantly. For $A = 2 \times 10^{-12}$ J/m the slope k changes in the interval $-0.7 < M/M_s < 0.7$ by about a factor of 2.5. In embodiments the anisotropy of hard magnetic storage layer 24 and the exchange coupling between nucleation host 21 and hard magnetic storage layer 24 is chosen to keep the change of the slope k smaller than 3. A ratio $k_{\max}/k_{\min} < 3$ indicates a strong coupling between nucleation host 21 and hard magnetic storage layer 24.

[0053] Furthermore the squareness S of the hysteresis loops was calculated.

$S = 1 - \left. \frac{dM}{dH} \frac{H_c}{M_s} \right|_{H_c}$. For the fully coupled case ($A = 1 \times 10^{-11}$ J/m) the squareness is 0.8. It is

important to note that for all calculations the hysteresis loops are not desheared.

[0054] FIG. 5 illustrates the reduction of the coercive field for nucleation host 21 with thickness t_G and a continuously increasing anisotropy, fully exchange coupled to the hard magnetic storage layer. The value of the anisotropy constant of the hard magnetic storage layer is changed from 1MJ/m³ to 4MJ/m³. FIG. 4 shows the reduction of the coercive field of hard magnetic storage layer 24 with a thickness of 20 nm and a value of the anisotropy constant of K_{hard} that is coupled to a G-layer. The anisotropy constant depends quadratically on the depth z in the layer, $K(z) = z^2 K_{\text{hard}} / t_G^2$. The grain has the maximum anisotropy (K_{hard}) at the surface of nucleation host 21. The thickness of nucleation host 21 is t_G . This embodiment does not have hard magnetic storage layer 24.

[0055] FIG. 6 illustrates the influence of the thickness of hard magnetic storage layer 24 on the energy barrier of the bilayer structure. The particular parameters are for illustrative purposes only – other embodiments have different parameters. The thickness of nucleation host is 20 nm (limit of infinite thick soft layer). The anisotropy in hard magnetic storage layer 24 is $K_{\text{hard}} = 1 \times 10^6$ J/m³. The grain diameter is 6 nm. The energy barrier levels out for thicknesses larger than 20nm. It is important to stress that at zero field the energy barrier does not depend on nucleation host 21. Due to thermal fluctuations a domain wall is formed in the nucleation host. The energy of the domain wall successively increases as it is driven by thermal fluctuations in the harder layers. The domain wall has largest energy when it is located in the hardest layer. The difference this highest energy state minus the energy of the homogenous state when the spins in the grain point up (down) denotes the energy barrier. For

all structures the highest energy state is given by the domain wall energy in the hard magnetic storage layer which is independent if a nucleation host 21 is present. The demagnetizing field of the structure may slightly decrease the energy barrier. The decrease of the energy barrier may be larger if a nucleation host is present as without nucleation host 21. In embodiments the energy barrier of a typical grain of hard magnetic storage layer 24 is smaller by 25% of the energy barrier of a typical grain of hard magnetic storage layer 24 without the nucleation host at most.

[0056] We note that parameters of an unknown magnetic recording media can be characterized by different methods. For example, an energy barrier of a hard magnetic storage layer can be determined: (i) by depositing only the hard magnetic storage layer on a non-magnetic substrate, or (ii) by removing a nucleation host from a multilayer structure; or (iii) by performing a micromagnetic calculation with parameters appropriate for the multilayer.

[0057] While the present invention has been particularly shown and described with reference to certain embodiments, it will be understood by those skilled in the art that various changes in form and detail may be made without departing from the spirit and scope of the invention. Accordingly, the disclosure was intended merely as illustrative and the scope of the invention is limited only as specified in the appended claims.

CLAIMS

1. A magnetic recording system, comprising:
a writing head; and
a disk, including a magnetic recording medium, comprising
 an essentially non-magnetic substrate
 an underlayer formed on the non-magnetic substrate; and
 an exchange coupled magnetic multilayer structure, including
 a hard magnetic storage layer, having a first coercive field $H_s > 0.5$ T, formed on the underlayer; and
 a nucleation host, having a second coercive field H_n without the hard magnetic storage layer, lower than the first coercive field, $H_n < H_s$, wherein
 said nucleation host
 is formed on the hard magnetic storage layer such that the hard magnetic storage layer is between the nucleation host and the non-magnetic substrate,
 is exchange coupled to the hard magnetic storage layer, and
 comprises ferromagnetic layers with increasing anisotropy constant K from layer to layer.
2. The magnetic recording system of claim 1, wherein:
 the nucleation host and the hard magnetic storage layer are in direct contact.
3. The magnetic recording system of claim 1, wherein:
 the hard magnetic storage layer comprises ferromagnetic layers with increasing anisotropy constant K values.
4. The magnetic recording system of claim 1, wherein:
 $H_c(\alpha = 20^\circ) < H_c(\alpha = 45^\circ)$, wherein $H_c(\alpha)$ is a coercive field of the recording medium if an angle between an external field and a normal of the recording medium is α .

5. The magnetic recording system of claim 1, wherein:
the nucleation host comprises grains with an average diameter greater than 2 nm and less than 10 nm.
6. The magnetic recording system of claim 1, wherein:
a coupling layer is disposed between the nucleation host and the hard magnetic storage layer.
7. The magnetic recording system of claim 1, wherein:
the nucleation host is separated from the hard magnetic storage layer by a layer of thickness less than 5nm.
8. A magnetic recording medium, comprising:
an essentially non-magnetic substrate;
an underlayer formed on the non-magnetic substrate; and
an exchange coupled magnetic multilayer structure, including
a hard magnetic storage layer, having a first coercive field $H_c > 0.5$ T, formed on the underlayer; and
a nucleation host, having a second coercive field H_n without the hard magnetic storage layer, lower than the first coercive field, $H_n < H_c$, wherein
said nucleation host
is formed on the hard magnetic storage layer such that the hard magnetic storage layer is between the nucleation host and the non-magnetic substrate,
is exchange coupled to the hard magnetic storage layer, and
comprises ferromagnetic layers with increasing anisotropy constant K from layer to layer, wherein at least two of the ferromagnetic layers are coupled with a thin exchange coupling layer.
9. The magnetic recording medium of claim 8, wherein:
the ferromagnetic layers are coupled with thin exchange coupling layers.

10. The magnetic recording medium of claim 8, wherein:

the thin exchange coupling layer provides an exchange constant A in excess of $A = 10^{-14}$ J/m.

11. The magnetic recording medium of claim 8, wherein:

$H_c(\alpha=20^\circ) < H_c(\alpha=45^\circ)$, wherein $H_c(\alpha)$ is a coercive field of the recording medium if an angle between an external field and a normal of the recording medium is α .

12. magnetic recording medium of claim 8, wherein:

the nucleation host comprises grains with an average diameter greater than 2 nm and less than 10 nm.

13. A magnetic recording medium, comprising:

an essentially non-magnetic substrate;

an underlayer formed on the non-magnetic substrate; and

an exchange coupled magnetic multilayer structure, including

a hard magnetic storage layer, formed from a large perpendicular anisotropy material based on at least one of Fe and Co, having a first coercive field H_s , formed on the underlayer; and

a nucleation host, having a second coercive field H_n without the hard magnetic storage layer, lower than the first coercive field, $H_n < H_s$, wherein

said nucleation host

is formed on the hard magnetic storage layer such that the hard magnetic storage layer is between the nucleation host and the non-magnetic substrate,

is exchange coupled to the hard magnetic storage layer, and

comprises ferromagnetic layers with increasing anisotropy constant K from layer to layer.

14. The magnetic recording medium of claim 13, wherein:

the large perpendicular anisotropy material is an FePt based alloy.

15. The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material is an L1₀-ordered phase material.
16. The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material is one of a CoPt based alloy, and a CoPtCr alloy.
17. The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material is one of a CoPtCrB, CoPtCrTa, and CoCr based granular media.
18. The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material is an alloy based on FePt--X, wherein X is one of Ni, Au, Cu, Pd and Ag.
19. The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material is an alloy based on CoPt--X, wherein X is one of Ni, Au, Cu, Pd and Ag.
20. The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material is a granular composite material based on FePt-C.
21. The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material is a granular composite material, selected from the group consisting of FePt-ZrO, FePt--MgO, and FePt--B₂O₃.
22. The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material is additionally formed from materials, selected from the group consisting of B, Cu, Ag, W, Mo, Ru, Ge, Nb, Pd, Sm, Nd, Dy, Hf, Mn, Ni.

23. The magnetic recording medium of claim 13, wherein:
the large perpendicular anisotropy material includes Silicon.

24. The magnetic recording system of claim 13, wherein the nucleation host comprises:
Oxygen.

Multilayer Exchange Spring Recording Media

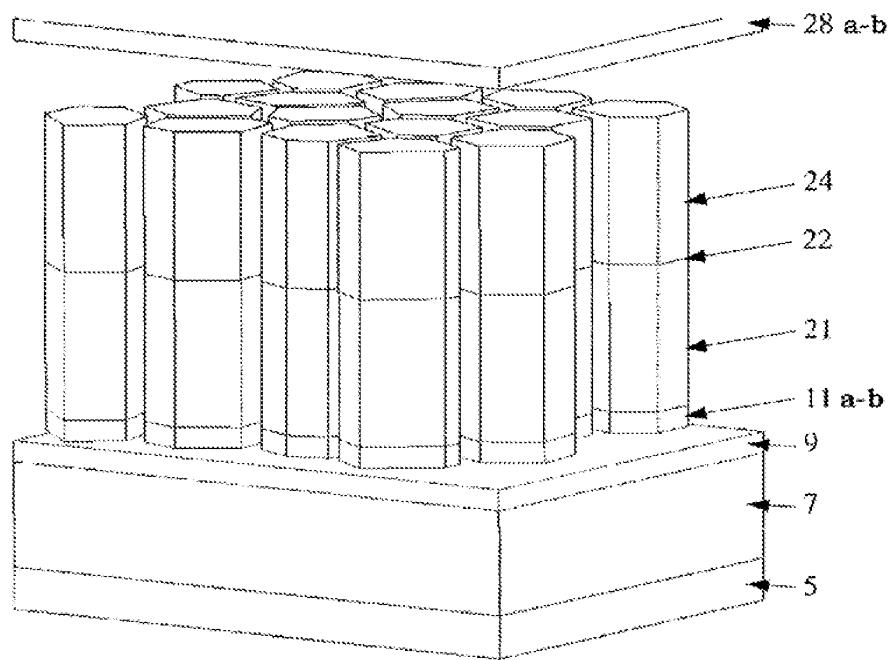
Dieter Suess

ABSTRACT

A multilayer exchange spring recording media consists of a magnetically hard magnetic storage layer strongly exchange coupled to a softer nucleation host. The strong exchange coupling can be through a coupling layer or direct. The hard magnetic storage layer has a strong perpendicular anisotropy. The nucleation host consists of one or more ferromagnetic coupled layers. For a multilayer nucleation host the anisotropy increases from layer to layer. The anisotropy in the softest layer of the nucleation host can be two times smaller than that of the hard magnetic storage layer. The lateral exchange between the grains is small. The nucleation host decreases the coercive field significantly while keeping the energy barrier of the hard layer almost unchanged. The coercive field of the total structure depends on one over number of layers in the nucleation host. The invention proposes a recording media that overcomes the writeability problem of perpendicular recording media.

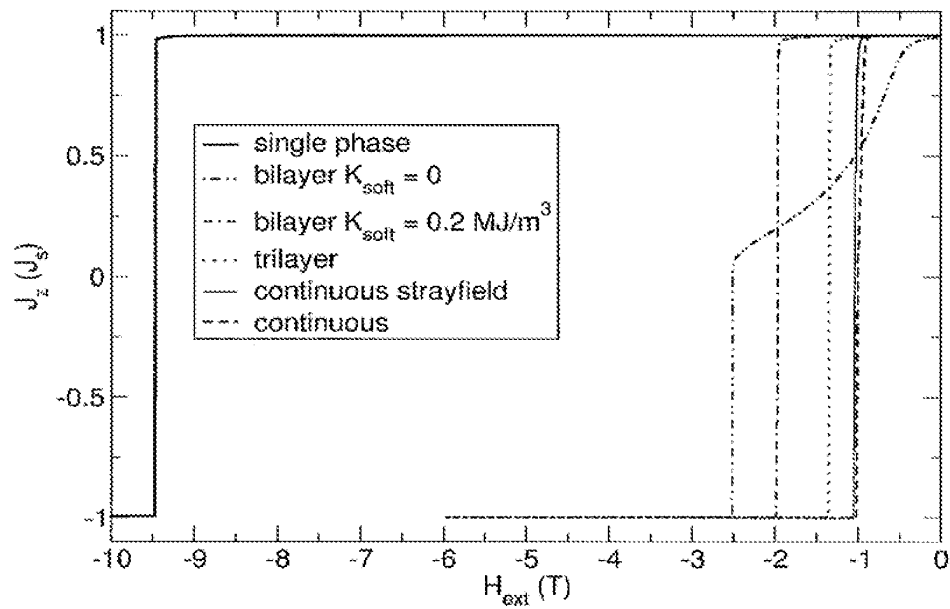
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Fig. 1



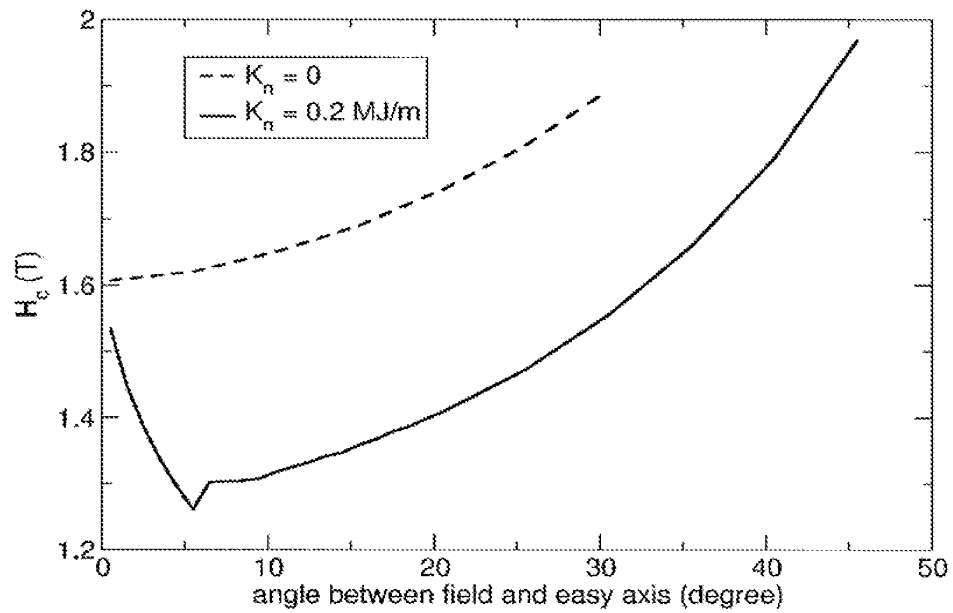
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Fig. 2



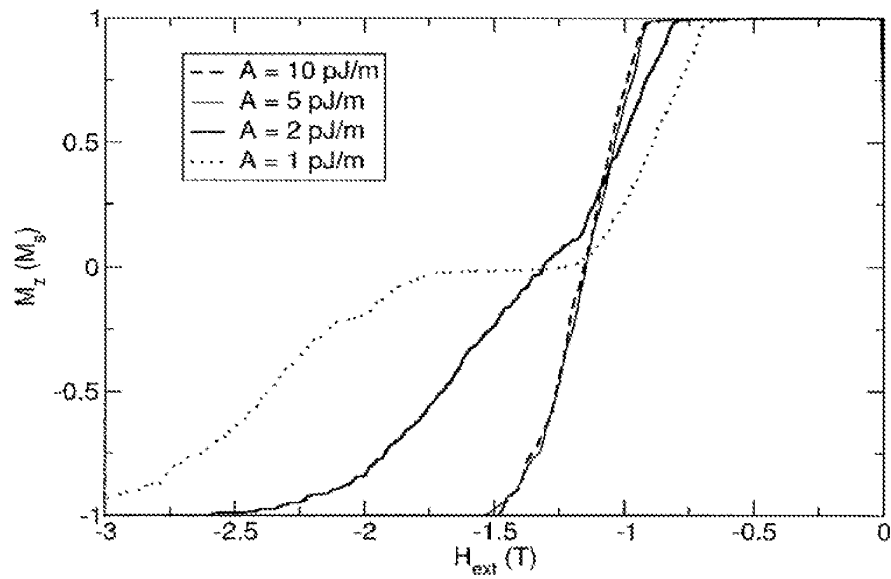
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Fig. 3



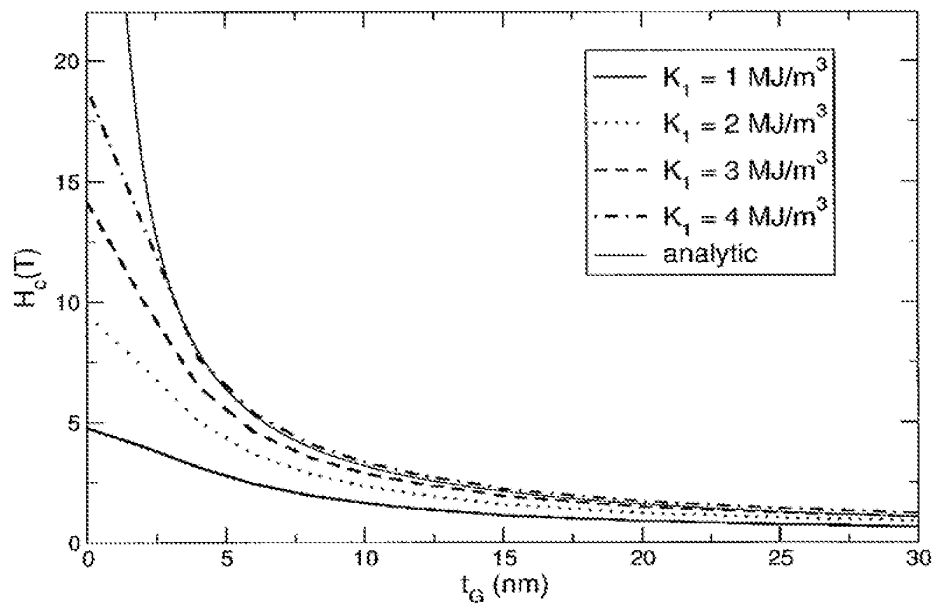
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Fig. 4



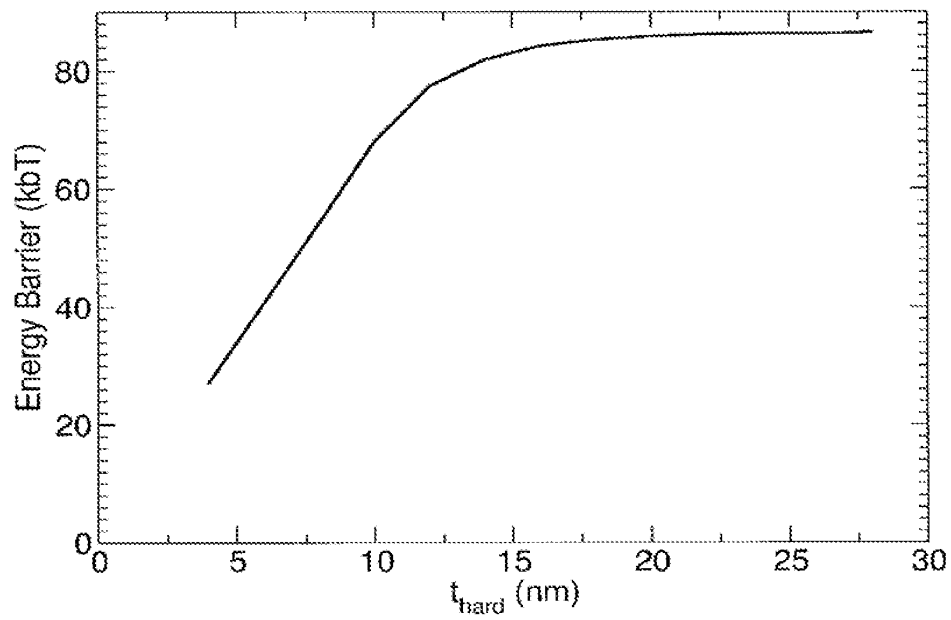
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Fig. 5



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Fig. 6



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Title of Invention	MULTILAYER EXCHANGE SPRING RECORDING MEDIA		
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Title of the Invention	MULTILAYER EXCHANGE SPRING RECORDING MEDIA		
Attorney Docket Number	SUSP02US2	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	6	Suggested Figure for Publication (if any)	1

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	SUSP02US2
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Title of Invention	MULTILAYER EXCHANGE SPRING RECORDING MEDIA		
Prior Application Status	Pending	Remove	
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	Continuation of	12/619849	2009-11-17
Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
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			Access Code ¹ (if applicable)
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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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	SUSP02US2
		Application Number	
Title of Invention	MULTILAYER EXCHANGE SPRING RECORDING MEDIA		

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.

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	SUSP02US2
		Application Number	
Title of Invention	MULTILAYER EXCHANGE SPRING RECORDING MEDIA		

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

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. ☐

Prefix	Given Name	Middle Name	Family Name	Suffix

Mailing Address Information For Applicant:

Address 1			
Address 2			
City		State/Province	
Country		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button.

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.

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	SUSP02US2
		Application Number	
Title of Invention	MULTILAYER EXCHANGE SPRING RECORDING MEDIA		

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.				
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.				

Signature:

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	/Gergely T. Zimanyi/		Date (YYYY-MM-DD)	2018-03-19	
First Name	Gergely	Last Name	Zimanyi	Registration Number	45,754
Additional Signature may be generated within this form by selecting the Add button.					

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	SUSP02US2
		Application Number	
Title of Invention	MULTILAYER EXCHANGE SPRING RECORDING MEDIA		

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.**

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		MULTILAYER EXCHANGE SPRING RECORDING MEDIA		
First Named Inventor/Applicant Name:		Dieter Suess		
Filer:		Gergely T. Zimanyi/Richard Pask		
Attorney Docket Number:		SUSP02US2		
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
UTILITY FILING FEE (ELECTRONIC FILING)	4011	1	75	75
UTILITY SEARCH FEE	2111	1	330	330
UTILITY EXAMINATION FEE	2311	1	380	380
Pages:				
Claims:				
CLAIMS IN EXCESS OF 20	2202	4	50	200
Miscellaneous-Filing:				
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				985

Electronic Acknowledgement Receipt	
EFS ID:	32098666
Application Number:	15925749
International Application Number:	
Confirmation Number:	8424
Title of Invention:	MULTILAYER EXCHANGE SPRING RECORDING MEDIA
First Named Inventor/Applicant Name:	Dieter Suess
Customer Number:	143793
Filer:	Gergely T. Zimanyi/Richard Pask
Filer Authorized By:	Gergely T. Zimanyi
Attorney Docket Number:	SUSP02US2
Receipt Date:	19-MAR-2018
Filing Date:	
Time Stamp:	23:38:41
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 985
RAM confirmation Number	032018INTEFSW23412800
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	Transmittal of New Application	1_SUSP02US2_Utility_Transmittal.pdf	532370	no	1
			83264570a979d951c460910ac264adc188f48d33		
Warnings:					
Information:					
2	Transmittal Letter	2_SUSP02US2_Fee_Transmittal.pdf	567698	no	1
			919eaa843a90e081fa63556c228d51965157f9da		
Warnings:					
Information:					
3		3_SUSP02US2_Con_Application.pdf	4405073	yes	20
			dba252634b2020885d6ba64264b371a8884c37e1		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	14	
	Claims		15	19	
	Abstract		20	20	
Warnings:					
Information:					
4	Drawings-only black and white line drawings	4_SUSP02US2_Drawings.pdf	380424	no	6
			a3b94d561e3ff5027138ef2ee0152e755b3a92d0		
Warnings:					
Information:					
5	Application Data Sheet	5_SUSP02US2_ADS.pdf	1331921	no	7
			64ae9d9c989f1051204559203fa4951b755634a2		

Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
6	Fee Worksheet (SB06)	fee-info.pdf	36648	no	2
			d3d18ce624bba368d7959f5742b815ca0e53c9c7		
Warnings:					
Information:					
			Total Files Size (in bytes):	7254134	
<p>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.</p> <p><u>New Applications Under 35 U.S.C. 111</u> 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.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> 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.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> 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.</p>					