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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/201,903	09/21/2021	11124027	67838.00217	1052

125632 759● ●9/●1/2●21
Snell & Wilmer (LA)
400 East Van Buren Street
One Arizona Center
Phoenix, AZ 85004

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 245 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.

Electronic Acknowledgement Receipt

EFS ID:	43557726
Application Number:	16201903
International Application Number:	
Confirmation Number:	1052
Title of Invention:	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES
First Named Inventor/Applicant Name:	Keith George Ferry
Customer Number:	125632
Filer:	Grant T. Langton/Lauren Coyle
Filer Authorized By:	Grant T. Langton
Attorney Docket Number:	67838.00217
Receipt Date:	19-AUG-2021
Filing Date:	27-NOV-2018
Time Stamp:	21:46:02
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$ 600
RAM confirmation Number	E20218IL46233453
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)	081921_IPT_as_filed_67838_00217.pdf	117925	no	1
			e05dd1d59d8c3d012144fa459e16b8d481d0d15a		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	38140	no	2
			290477fc30f87e45cd144a847b11965ac3ef6b4c		
Warnings:					
Information:					
Total Files Size (in bytes):			156065		
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. <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. <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. <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.					

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)

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.

125632 7590 05/19/2021
Snell & Wilmer (LA)
400 East Van Buren Street
One Arizona Center
Phoenix, AZ 85004

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.

Lauren Coyle	(Typed or printed name)
/Lauren Coyle/	(Signature)
August 19, 2021	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/201.903	11/27/2018	Keith George Ferry	67838.00217	1052

TITLE OF INVENTION: DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES

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	08/19/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
TESKIN, FRED M	1762	428-519000

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

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

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

1 _____
2 Snell & Wilmer L.L.P.
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. 19-2814

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 /Grant T. Langton/

Date August 19, 2021

Typed or printed name Grant T. Langton

Registration No. 39,739

Electronic Patent Application Fee Transmittal				
Application Number:		16201903		
Filing Date:		27-Nov-2018		
Title of Invention:		DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES		
First Named Inventor/Applicant Name:		Keith George Ferry		
Filer:		Grant T. Langton/Lauren Coyle		
Attorney Docket Number:		67838.00217		
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

<i>Index of Claims</i> 	Application/Control No. 16/201,903	Applicant(s)/Patent Under Reexamination Ferry et al.
	Examiner FRED M TESKIN	Art Unit 1762

✓	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	10/24/2020	05/16/2021	05/22/2021						
	1	✓	=	=						
	2	✓	=	=						
	3	✓	=	=						
	4	✓	=	=						
	5	✓	=	=						
	6	✓	=	=						
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	10	✓	=	=						
	11	✓	=	=						
	12	✓	=	=						
	13	-	-	-						
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	25	✓	=	=						
	26	✓	=	=						
	27	✓	=	=						
	28	✓	=	-						
	29	✓	=	=						



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/201,903	11/27/2018	Keith George Ferry	67838.00217	1052
125632	7590	05/26/2021		
Snell & Wilmer (LA) 400 East Van Buren Street One Arizona Center Phoenix, AZ 85004			EXAMINER TESKIN, FRED M	
			ART UNIT	PAPER NUMBER
			1762	
			NOTIFICATION DATE	DELIVERY MODE
			05/26/2021	ELECTRONIC

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

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

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

IPLADOCKET@swlaw.com
glangton@swlaw.com
lcoyle@swlaw.com

Corrected Notice of Allowability	Application No. 16/201,903	Applicant(s) Ferry et al.	
	Examiner FRED M TESKIN	Art Unit 1762	AIA (FITF) Status Yes

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

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

1. ☒ This communication is responsive to printer query of 05/21/2021.
☐ 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 See Continuation Sheet. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov**.

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

Certified copies:

a) ☐ All b) ☐ Some *c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

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

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

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

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

Attachment(s)

1. ☐ Notice of References Cited (PTO-892) 2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____. 3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____. 4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____.	5. ☐ Examiner's Amendment/Comment 6. ☐ Examiner's Statement of Reasons for Allowance 7. ☐ Other _____.
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	/FRED M TESKIN/ Primary Examiner, Art Unit 1762
--	--

Continuation of 3. The allowed claim(s) is/are: 1-12,14,18-19,21-27 and 29



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NOTICE OF ALLOWANCE AND FEE(S) DUE

125632 7590 05/19/2021
Snell & Wilmer (LA)
400 East Van Buren Street
One Arizona Center
Phoenix, AZ 85004

EXAMINER

TESKIN, FRED M

ART UNIT

PAPER NUMBER

1762

DATE MAILED: 05/19/2021

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/201,903	11/27/2018	Keith George Ferry	67838.00217	1052

TITLE OF INVENTION: DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES

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	08/19/2021

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

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

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16/201.903	11/27/2018	Keith George Ferry	67838.00217	1052

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EXAMINER	ART UNIT	CLASS-SUBCLASS
TESKIN, FRED M	1762	428-519000

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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)
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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. _____



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16/201,903	11/27/2018	Keith George Ferry	67838.00217	1052
125632	7590	05/19/2021	EXAMINER	
Snell & Wilmer (LA) 400 East Van Buren Street One Arizona Center Phoenix, AZ 85004			TESKIN, FRED M	
			ART UNIT	PAPER NUMBER
			1762	

DATE MAILED: 05/19/2021

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.

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

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

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

Notice of Allowability	Application No. 16/201,903	Applicant(s) Ferry et al.	
	Examiner FRED M TESKIN	Art Unit 1762	AIA (FITF) Status Yes

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

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

1. ☒ This communication is responsive to AMENDMENT/REMARKS/TERMINAL DISCLAIMER FILED 03/01/2021.
☐ 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 See Continuation Sheet. 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 ____.	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 ____.	

	/FRED M TESKIN/ Primary Examiner, Art Unit 1762
--	--

Continuation of 3. The allowed claim(s) is/are: 1-12,14,18-19 and 21-29

Issue Classification 	Application/Control No. 16/201,903	Applicant(s)/Patent Under Reexamination Ferry et al.
	Examiner FRED M TESKIN	Art Unit 1762

CPC						
Symbol					Type	Version
B60C	/	13	/	001	F	2013-01-01
B44C	/	1	/	162	I	2013-01-01
B29C	/	65	/	52	I	2013-01-01
B29C	/	66	/	02245	I	2013-01-01
B29C	/	66	/	5326	I	2013-01-01
B29D	/	30	/	72	I	2013-01-01
B32B	/	7	/	12	I	2013-01-01
B32B	/	25	/	042	I	2013-01-01
B29D	/	2030	/	728	A	2013-01-01
B29L	/	2030	/	00	A	2013-01-01

CPC Combination Sets					
Symbol				Type	Set
	/		/		

NONE (Assistant Examiner)		Total Claims Allowed: 24	
/FRED M TESKIN/ Primary Examiner, Art Unit 1762 (Primary Examiner)		16 May 2021 (Date)	O.G. Print Claim(s) 1
			O.G. Print Figure 8D

Issue Classification 	Application/Control No. 16/201,903	Applicant(s)/Patent Under Reexamination Ferry et al.
	Examiner FRED M TESKIN	Art Unit 1762

INTERNATIONAL CLASSIFICATION				
CLAIMED				
B60C	/	13	/	00
B44C	/	1	/	16
B29C	/	65	/	52
B29D	/	30	/	72
B32B	/	7	/	12
B32B	/	25	/	04
	/		/	

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS
156	116

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

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	24	
/FRED M TESKIN/ Primary Examiner, Art Unit 1762	16 May 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	8D

Issue Classification 	Application/Control No. 16/201,903	Applicant(s)/Patent Under Reexamination Ferry et al.
	Examiner FRED M TESKIN	Art Unit 1762

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

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

NONE (Assistant Examiner) (Date)		Total Claims Allowed: 24	
/FRED M TESKIN/ Primary Examiner, Art Unit 1762 (Primary Examiner) (Date)		16 May 2021 (Date)	O.G. Print Claim(s) 1
			O.G. Print Figure 8D

WEST Search History for Application 16201903

Creation Date: 2021051616:57

Interference Searches

Query	DB	Hits	Op.	Plur.	Thes.	Date
((DISPLAY NEAR2 INDICIA) OR DECAL OR APPLIQUE) AND ((VULCANIZED NEAR1 RUBBER) OR TIRE) AND ((INTERMEDIATE OR BARRIER) NEAR2 LAYER) AND (ADHESIVE NEAR2 LAYER)).CLM.	PGPB	1	OR	YES		10-24-2020
((DISPLAY NEAR2 INDICIA) OR DECAL OR APPLIQUE) AND ((VULCANIZED NEAR1 RUBBER) OR TIRE) AND ((INTERMEDIATE OR BARRIER) NEAR2 LAYER) AND (ADHESIVE NEAR2 LAYER)).CLM.	PGPB	1	OR	YES		05-16-2021
((DISPLAY NEAR2 INDICIA) OR DECAL OR APPLIQUE) AND ((VULCANIZED NEAR1 RUBBER) OR TIRE) AND ((INTERMEDIATE OR BARRIER) NEAR2 LAYER) AND (ADHESIVE NEAR2 LAYER)).CLM.) and @ pd > 20201024	PGPB	0	OR	YES		05-16-2021
((ASSEMBLY OR APPLIQUE) AND ((VULCANIZED OR VULCANISED) NEAR1 RUBBER) OR TIRE AND (OUTER NEAR1 LAYER) AND (BARRIER NEAR2 (MATERIAL OR COMPOSITION OR COMPONENT))).CLM.	PGPB	143	OR	YES		05-16-2021
((ASSEMBLY OR APPLIQUE) AND ((VULCANIZED OR VULCANISED) NEAR1 RUBBER) OR TIRE AND (OUTER NEAR1 LAYER) AND (BARRIER NEAR2 (MATERIAL OR COMPOSITION OR COMPONENT))).CLM.) AND (ADHESIVE NEAR2 LAYER)	PGPB	26	OR	YES		05-16-2021

Prior Art Searches

Query	DB	Hits	Op.	Plur.	Thes.	Date
(B32B 7/12)! [CPC, CPCL]	PGPB, USPT, USOC	136359	OR	YES		10-24-2020
B60C 13/001	PGPB, USPT, USOC	24905	OR	YES		10-24-2020

(B60C 13/001) AND ((B32B 7/12)! [CPC, CPCL])	PGPB, USPT, USOC	321	OR	YES		10-24-2020
(B60C 13/001 AND (B32B 7/12)! [CPC, CPCL]) AND (INTERMEDIATE NEAR2 LAYER)	PGPB, USPT, USOC	43	OR	YES		10-24-2020
(B60C 13/001 AND (B32B 7/12)! [CPC, CPCL]) AND (APPLIQUE OR DECAL OR DISPLAY)	PGPB, USPT, USOC	35	OR	YES		10-24-2020
B29D 2030/728	PGPB, USPT, USOC	20935	OR	YES		10-24-2020
(B29D 2030/728) AND ((B32B 7/12)! [CPC, CPCL])	PGPB, USPT, USOC	2122	OR	YES		10-24-2020
(B29D 2030/728 AND (B32B 7/12)! [CPC, CPCL]) AND ((APPLIQUE OR INDICIA OR DECAL) NEAR6 (ELASTOMER OR ELASTOMERIC OR RUBBER))	PGPB, USPT, USOC	6	OR	YES		10-24-2020
((428/914))! [CCLS]	PGPB, USPT, USOC	3992	OR	YES		10-24-2020
((156/240))! [CCLS]	PGPB, USPT, USOC	1268	OR	YES		10-24-2020
((156/116))! [CCLS]	PGPB, USPT, USOC	197	OR	YES		10-24-2020
((((DISPLAY NEAR1 INDICIA) OR DECAL OR APPLIQUE) AND (VULCANIZED RUBBER OR TIRE) AND (INTERMEDIATE NEAR2 LAYER) AND (ADHESIVE NEAR2 LAYER))).CLM.	PGPB	3	OR	YES		10-24-2020
((((DISPLAY NEAR1 INDICIA) OR DECAL OR APPLIQUE) AND ((VULCANIZED NEAR1 RUBBER) OR TIRE) AND (INTERMEDIATE NEAR2 LAYER) AND (ADHESIVE NEAR2 LAYER))).CLM.	PGPB	1	OR	YES		10-24-2020
((((DISPLAY NEAR1 INDICIA) OR DECAL OR APPLIQUE) AND ((VULCANIZED NEAR1 RUBBER) OR TIRE) AND (INTERMEDIATE NEAR2 LAYER) AND (ADHESIVE NEAR2 LAYER))).CLM.) and	PGPB	0	OR	YES		10-24-2020

@pd > 20180917						
(B32B 7/12)! [CPC, CPCL]	PGPB, USPT, USOC	142463	OR	YES		05-16-2021
B60C 13/001	PGPB, USPT, USOC	26402	OR	YES		05-16-2021
(B60C 13/001) AND ((B32B 7/12)! [CPC, CPCL])	PGPB, USPT, USOC	343	OR	YES		05-16-2021
(B60C 13/001 AND (B32B 7/12)! [CPC, CPCL]) AND (INTERMEDIATE NEAR2 LAYER)	PGPB, USPT, USOC	45	OR	YES		05-16-2021
(B60C 13/001 AND (B32B 7/12)! [CPC, CPCL]) AND (APPLIQUE OR DECAL OR DISPLAY)	PGPB, USPT, USOC	37	OR	YES		05-16-2021
B29D 2030/728	PGPB, USPT, USOC	21967	OR	YES		05-16-2021
(B29D 2030/728) AND ((B32B 7/12)! [CPC, CPCL])	PGPB, USPT, USOC	2298	OR	YES		05-16-2021
(B29D 2030/728 AND (B32B 7/12)! [CPC, CPCL]) AND ((APPLIQUE OR INDICIA OR DECAL) NEAR6 (ELASTOMER OR ELASTOMERIC OR RUBBER))	PGPB, USPT, USOC	6	OR	YES		05-16-2021
(((428/914)))! [CCLS]	PGPB, USPT, USOC	3992	OR	YES		05-16-2021
(((156/240)))! [CCLS]	PGPB, USPT, USOC	1268	OR	YES		05-16-2021
(((156/116)))! [CCLS]	PGPB, USPT, USOC	197	OR	YES		05-16-2021
(((DISPLAY NEAR1 INDICIA) OR DECAL OR APPLIQUE) AND (VULCANIZED RUBBER OR TIRE) AND (INTERMEDIATE NEAR2 LAYER) AND (ADHESIVE NEAR2 LAYER)).CLM.	PGPB	3	OR	YES		05-16-2021
(((DISPLAY NEAR1 INDICIA) OR DECAL OR APPLIQUE) AND ((VULCANIZED	PGPB	1	OR	YES		05-16-2021

NEAR1 RUBBER) OR TIRE) AND (INTERMEDIATE NEAR2 LAYER) AND (ADHESIVE NEAR2 LAYER)).CLM.						
((((DISPLAY NEAR1 INDICIA) OR DECAL OR APPLIQUE) AND ((VULCANIZED NEAR1 RUBBER) OR TIRE) AND (INTERMEDIATE NEAR2 LAYER) AND (ADHESIVE NEAR2 LAYER)).CLM.) and @pd > 20180917	PGPB	0	OR	YES		05-16-2021
(156/116)! [CCLS]	PGPB, USPT, USOC	197	OR	YES		05-16-2021
(B60C 13/001)! [CPC, CPCL]	PGPB, USPT, USOC	68734	OR	YES		05-16-2021
B32B 7/12	PGPB, USPT, USOC	152094	OR	YES		05-16-2021
(B32B 7/12) AND ((B60C 13/001)! [CPC, CPCL])	PGPB, USPT, USOC	529	OR	YES		05-16-2021
B29D 2030/728	PGPB, USPT, USOC	21967	OR	YES		05-16-2021
(B29D 2030/728) AND (B32B 7/12 AND (B60C 13/001)! [CPC, CPCL])	PGPB, USPT, USOC	99	OR	YES		05-16-2021
(B29D 2030/728 AND B32B 7/12 AND (B60C 13/001)! [CPC, CPCL]) AND (BARRIER NEAR2 (MATERIAL OR COMPOSITION OR COMPONENT))	PGPB, USPT, USOC	14	OR	YES		05-16-2021

<i>Index of Claims</i> 	Application/Control No. 16/201,903	Applicant(s)/Patent Under Reexamination Ferry et al.
	Examiner FRED M TESKIN	Art Unit 1762

✓	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	10/24/2020	05/16/2021						
	1	✓	=						
	2	✓	=						
	3	✓	=						
	4	✓	=						
	5	✓	=						
	6	✓	=						
	7	✓	=						
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	25	✓	=						
	26	✓	=						
	27	✓	=						
	28	✓	=						
	29	✓	=						

Search Notes 	Application/Control No. 16/201,903	Applicant(s)/Patent Under Reexamination Ferry et al.
	Examiner FRED M TESKIN	Art Unit 1762

CPC - Searched*		
Symbol	Date	Examiner
(B60C 13/001, B32B 7/12, B29D 2030/728).CPC. - TEXT LIMITED	10/24/2020	/FT/
(B60C 13/001, B32B 7/12, B29D 2030/728).CPC. - TEXT LIMITED	05/16/2021	/FT/

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner
428	914	10/24/2020	/FT/
427	148	10/24/2020	/FT/
156	116, 240	10/24/2020	/FT/

* 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
(B60C 13/001, B32B 7/12, B29D 2030/728).CPC. - TEXT LIMITED	10/24/2020	/FT/
PALM INVENTORS SEARCH; REVIEWED PARENT CASE RECORD	10/24/2020	/FT/

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
US PG/PUB	TEXT (SEE WEST PRINTOUT)	10/24/2020	/FT/
US PB/PUB	TEXT (SEE WEST PRINTOUT)	05/16/2021	/FT/

	/FRED M TESKIN/ Primary Examiner, Art Unit 1762
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Doc Code: DISQ.E.FILE

Document Description: Electronic Terminal Disclaimer – Approved

Application No.: 16201903

Filing Date: 27-Nov-2018

Applicant/Patent under Reexamination: Ferry

Electronic Terminal Disclaimer filed on March 1, 2021

☒ APPROVED

This patent is subject to a terminal disclaimer

☐ DISAPPROVED

Approved/Disapproved by: Electronic Terminal Disclaimer automatically approved by EFS-Web

U.S. Patent and Trademark Office

Doc Code: DIST.E.FILE Document Description: Electronic Terminal Disclaimer - Filed		PTO/SB/26 U.S. Patent and Trademark Office Department of Commerce	
Electronic Petition Request	TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT		
Application Number	16201903		
Filing Date	27-Nov-2018		
First Named Inventor	Keith Ferry		
Attorney Docket Number	67838.00217		
Title of Invention	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES		
☒ Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action ☒ This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.			
Owner		Percent Interest	
Keith George Ferry		100%	
Jason Michael Busch		100%	
The owner(s) with percent interest listed above 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 number(s) 10137741			

as the term of said prior patent is presently shortened by any terminal disclaimer. The owner 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 owner 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.

☒ Terminal disclaimer fee under 37 CFR 1.20(d) is included with Electronic Terminal Disclaimer request.

☐ I certify, in accordance with 37 CFR 1.4(d)(4), that the terminal disclaimer fee under 37 CFR 1.20(d) required for this terminal disclaimer has already been paid in the above-identified application.

Applicant claims the following fee status:

☒ Small Entity

☐ Micro Entity

☐ Regular Undiscounted

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

THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:

☒ An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application

Registration Number 39739

☐ A sole inventor

☐ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application

☐ A joint inventor; all of whom are signing this request

Signature	/Grant T. Langton/
Name	Grant T. Langton

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).
Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

Electronic Patent Application Fee Transmittal				
Application Number:		16201903		
Filing Date:		27-Nov-2018		
Title of Invention:		DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES		
First Named Inventor/Applicant Name:		Keith George Ferry		
Filer:		Grant T. Langton/Lauren Coyle		
Attorney Docket Number:		67838.00217		
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
STATUTORY OR TERMINAL DISCLAIMER	2814	1	170	170
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
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 (\$)				170

Electronic Acknowledgement Receipt

EFS ID:	42060285
Application Number:	16201903
International Application Number:	
Confirmation Number:	1052
Title of Invention:	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES
First Named Inventor/Applicant Name:	Keith George Ferry
Customer Number:	125632
Filer:	Grant T. Langton/Lauren Coyle
Filer Authorized By:	Grant T. Langton
Attorney Docket Number:	67838.00217
Receipt Date:	01-MAR-2021
Filing Date:	27-NOV-2018
Time Stamp:	23:28:46
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$ 170
RAM confirmation Number	E202131N28423127
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File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Terminal Disclaimer-Filed (Electronic)	eTerminal-Disclaimer.pdf	34637	no	3
			60f0fc3d8213864d184704b7fbf1770ba8b6daa		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30526	no	2
			8171364e3fa826354b5165723d2580fb3da8f7f2		
Warnings:					
Information:					
Total Files Size (in bytes):			65163		
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. <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. <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. <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.					

Electronic Patent Application Fee Transmittal				
Application Number:		16201903		
Filing Date:		27-Nov-2018		
Title of Invention:		DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES		
First Named Inventor/Applicant Name:		Keith George Ferry		
Filer:		Grant T. Langton/Lauren Coyle		
Attorney Docket Number:		67838.00217		
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 - 1 month with \$0 paid	2251	1	110	110
Miscellaneous:				
Total in USD (\$)				110

REMARKS

Applicant has amended claims 1, 5, 9, 11, 18, 19, and 24, and has cancelled claim 28. Claims 13, 15 to 17, and 20 have earlier been cancelled. Accordingly, Applicant submits that upon entry of this response that claims 1 to 12, 14, 18, 19, 21 to 27, and 29 remain pending in this patent application. Applicant not addresses each and every point raised by the Examiner in the above-noted Office action as follows.

I. Rejection Under Section 112

Claim 9 has been rejected under 35 U.S.C. §112, second paragraph, as being allegedly indefinite. Applicant has amended claim 9 to address this issue and, in view thereof, respectfully requests that the rejection of claim 9 under 35 U.S.C. §112 be reconsidered and withdrawn.

II. Rejection of Claims Under Section 102

Claims 1, 11, and 19 have been rejected under 35 U.S.C. §102 as being allegedly anticipated by DeTrano (US 5,300,164). Applicant has amended independent claims 1, 11, and 19 to recite the feature that the outer layer of the assembly comprises a barrier material composition (to mitigate the unwanted migration of material from the vulcanized rubber article or tire). Applicant submits that DeTrano fails to disclose a decorative applique construction comprising the feature not recited in the above-noted independent claims, and as such fails to properly anticipate the subject matter of such claims. In view thereof, Applicant submits that its assembly as recited in amended independent claims 1, 11 and 19 is properly novel over DeTrano, and respectfully requests that the rejection of such claims under 35 U.S.C. §102 based on DeTrano be reconsidered and withdrawn.

III. Rejection of Claims Under Section 103 Based on DeTrano

Claims 2 to 5, 10, 12, and 14 have been rejected under 35 U.S.C. §103 as being allegedly unpatentable over by DeTrano. Applicant has amended independent claims 1 and 11 in the manner described above in Section II, and submits that DeTrano fails to disclose or remotely suggest the feature noted above in Section II as recited in such claims. One having ordinary skill in the art aware of DeTrano would not find suggestion or motivation to make an assembly as recited in

Applicant's independent claims 1 and 11 wherein the outer layer comprises a barrier material composition. For this reason, Applicant submits that the subject matter as recited in amended independent claims 1 and 11 is properly patentable over DeTrano, and respectfully requests that the rejection of such claims under 35 U.S.C. §103 based on DeTrano be reconsidered and withdrawn.

IV. Rejection of Claims Under Section 103 Based on DeTrano and Miyazaki

Claim 6 has been rejected under 35 U.S.C. §103 as being allegedly unpatentable over DeTrano in view of Miyazaki (US 6,235,376). Applicant has amended independent claim 1 in the manner described above in Section II, and submits for the reasons presented above in Section III that DeTrano fails to disclose or remotely suggest the feature now recited in such claim. Miyazaki is relied upon by the Examiner for its disclosure of a protective layer (which feature is admittedly not disclosed in DeTrano). However, like DeTrano, Miyazaki also fails to disclose or remotely suggest the feature now disclosed in amended independent claim 1. For this reason, one having ordinary skill in the art taking DeTrano and Miyazaki in combination would not find suggestion or motivation to make the assembly recited in Applicant's amended independent claim 1 comprising the feature that is missing in both references.

In view thereof, Applicant submits that its assembly as recited in amended independent claim 1 is properly patentable over the combination of DeTrano and Miyazaki, and respectfully requests that the rejection of claim 6 (depending from such amended independent claim 1) under 35 U.S.C. §103 based on the combination of DeTrano and Miyazaki be reconsidered and withdrawn.

V. Rejection of Claims Under Section 103 Based on DeTrano and Parsons

Claims 7 to 9, 18, and 21 to 29 have been rejected under 35 U.S.C. §103 as being allegedly unpatentable over DeTrano in view of Parsons (US 2005/0059308). Applicant has amended independent claims 1 and 11 in the manner described above in Section II, and have also amended independent claims 19 and 24 in a similar manner. In view thereof, Applicant submits that DeTrano fails to disclose or remotely suggest the feature now recited in such amended independent claims. Parsons is relied upon by the Examiner for its disclosure of a RFID element embodied in

a label for mounting on a tire surface (which feature is admittedly not disclosed in DeTrano). However, like DeTrano, Parsons also fails to disclose or remotely suggest the feature now disclosed in amended independent claims 1, 11, 19, and 24. For this reason, one having ordinary skill in the art taking DeTrano and Parsons in combination would not find suggestion or motivation to make the assembly recited in Applicant's amended independent claims 1, 11, 19, and 24 comprising the feature that is missing in both references.

In view thereof, Applicant submits that its assembly as recited in amended independent claims 1, 11, 19, and 24 is properly patentable over the combination of DeTrano and Parsons, and respectfully requests that the rejection of the above noted claims (depending from such respective amended independent claims) under 35 U.S.C. §103 based on the combination of DeTrano and Parsons be reconsidered and withdrawn.

VI. Rejection of Claims for Nonstatutory Double Patenting

Claims 24 to 27, and 29 have been rejected on the ground of nonstatutory double patenting in view of claims 1 to 3, and 7 to 9 of U.S. Patent No. 10,137,741. Applicant encloses herewith a property prepared Terminal Disclaimer and, in view thereof, respectfully requests that the rejection of claims 14 to 27, and 29 be reconsidered and withdrawn.

VII. Conclusion and Request for Examiner Interview

For all the reasons presented above, Applicant respectfully requests that the rejections of the claims under 35 U.S.C. §§112, 102 and 103, and for nonstatutory double patenting, be reconsidered and withdrawn, and that the claims pending in this patent application be passed to allowance.

Should, after considering the Applicant's amendments and reasons presented herein, the Examiner feel that the application claims are not in proper condition for allowance, Applicant respectfully requests that the Examiner please contact its below-designated patent attorney for the purposes of advancing the efficient prosecution of this patent application.

The Commissioner is hereby authorized to charge any fees, which may be required, or credit any overpayment, to Deposit Account No. 19-2814.

Respectfully submitted,

Date: March 1, 2021

CUSTOMER NUMBER

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/ Grant T. Langton/

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Amendments to the Claims

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

Listing of the Claims:

1. (Currently Amended) An assembly for attachment with a vulcanized rubber article comprising:
 - an outer layer of elastomeric material having a visual feature; and
 - an adhesive layer adhered to an interface surface of the outer layer, wherein at least a portion of the outer layer adjacent the interface surface comprises one or both of the outer layer or the adhesive layer has a barrier material composition, and wherein the adhesive layer is formed from a material capable of chemically bonding with a surface of a vulcanized rubber article.
2. (Previously Presented) The assembly as recited in claim 1 wherein the outer layer comprises a first layer and a second layer disposed beneath the first layer.
3. (Previously Presented) The assembly as recited in claim 2 wherein the first layer is colored differently from the second layer.
4. (Previously Presented) The assembly as recited in claim 1 further comprising an intermediate layer interposed between the outer layer and the adhesive layer.
5. (Currently Amended) The assembly as recited in claim 1 ~~therein~~ wherein the barrier material composition impairs migration of a material constituent within the assembly when the assembly is attached to a vulcanized rubber article.
6. (Previously Presented) The assembly as recited in claim 1 further comprising a protective layer disposed over the outer layer and forming an outermost surface of the assembly, the protective layer formed from an optically transparent material.

7. (Previously Presented) The assembly as recited in claim 1 further comprising a cavity disposed therein.
8. (Previously Presented) The assembly as recited in claim 7 further comprising an element disposed within the cavity.
9. (Currently Amended) The assembly as recited in claim 7 + wherein the cavity is disposed beneath the outer layer.
10. (Previously Presented) The assembly as recited in claim 2 wherein the first layer includes one or more openings therethrough, and wherein the second layer is visible through the one or more openings.
11. (Currently Amended) A method for attaching an assembly to a surface of a vulcanized rubber article comprising the steps of;
 - identifying a surface of a vulcanized rubber article;
 - placing an assembly into contact with the identified surface, wherein the assembly comprises:
 - an outer layer of elastomeric material, wherein the outer layer is in contact with an adhesive layer interposed between the ~~prepared~~ identified surface and the assembly that bonds the assembly to the vulcanized rubber article, and wherein ~~one of~~ the outer layer ~~or adhesive layer~~ comprises a barrier material composition to mitigate migration of material from the vulcanized rubber article.
12. (Previously Presented) The method as recited in claim 11 further comprising preparing the identified surface before the step of placing.
13. (Cancelled)

14. (Previously Presented) The method as recited in claim 11 further comprising applying pressure to the assembly after the step of placing.
15. (Cancelled)
16. (Cancelled)
17. (Cancelled)
18. (Currently Amended) The method as recited in claim 11 wherein the vulcanized rubber article is tire, wherein the identified surface is a sidewall surface of the tire, and wherein the assembly includes a cavity disposed therein for accommodating placement of an element.
19. (Currently Amended) A vulcanized rubber tire comprising:
a target surface disposed along a portion of the rubber tire;
an assembly disposed onto the target surface and comprising:
 an outer layer of elastomeric material; and
 an adhesive layer connected with the outer layer;
wherein at least a portion of one of the outer layer or the adhesive layer comprises a barrier material composition to mitigate migration of material from the rubber tire.
20. (Cancelled)
21. (Previously Presented) The rubber tire as recited in claim 19 wherein the assembly further comprises a cavity disposed therein.
22. (Previously Presented) The rubber tire as recited in claim 21 wherein an element is disposed within the cavity.

23. (Previously Presented) The rubber tire as recited in claim 21 wherein the cavity is disposed beneath the outer layer.
24. (Currently Amended) An assembly for attachment to a vulcanized rubber tire comprising;
an outer layer formed from an elastomeric material;
an adhesive layer bonding the assembly to portion of a vulcanized rubber tire elastomeric material; and
a cavity disposed within the assembly for accommodating an element therein;
wherein the outer layer comprises a material composition that acts as a barrier to material migrating from the vulcanized rubber tire.
25. (Previously Presented) The assembly as recited in claim 24 wherein at least a portion of the cavity is disposed beneath the outer layer.
26. (Previously Presented) The assembly as recited in claim 24 wherein the adhesive layer is connected with the outer layer.
27. (Previously Presented) The assembly as recited in claim 24 wherein the outer layer includes an indicia along an outer surface.
28. (Cancelled)
29. (Previously Presented) The assembly as recited in claim 24 further comprising an intermediate layer disposed beneath the outer layer.

Electronic Acknowledgement Receipt

EFS ID:	42060246
Application Number:	16201903
International Application Number:	
Confirmation Number:	1052
Title of Invention:	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES
First Named Inventor/Applicant Name:	Keith George Ferry
Customer Number:	125632
Filer:	Grant T. Langton/Lauren Coyle
Filer Authorized By:	Grant T. Langton
Attorney Docket Number:	67838.00217
Receipt Date:	01-MAR-2021
Filing Date:	27-NOV-2018
Time Stamp:	23:07:28
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$ 110
RAM confirmation Number	E202131N09133006
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		030121_ROA_as_filed_67838_0217.pdf	104264	yes	9
			648fe859bb79853fe30c9c2ce891bf392a480823		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Amendment/Req. Reconsideration-After Non-Final Reject		1	1	
	Claims		2	5	
	Applicant Arguments/Remarks Made in an Amendment		6	9	
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30968	no	2
			8977372451e49e14940fa8f6d47666b8a3646673		
Warnings:					
Information:					
Total Files Size (in bytes):			135232		

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New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.:	16/201,903	Confirmation No.:	1052
Inventor(s):	Keith George Ferry et al.	Group Art Unit:	2871
Filed:	November 27, 2018	Examiner:	Teskin, Fred M.
Title:	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES	Docket No.	67838.00217

Mail Stop Amendments
Commissioner of Patents
P. O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO NON-FINAL OFFICE ACTION

Dear Commissioner:

In response to the non-final Office action dated October 29, 2020, Applicant respectfully requests that the above-identified Patent application be amended as follows:

Amendments to the Claims begin on page 2 of this paper.

Remarks/Arguments begin on page 6 of this paper.

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

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/201,903	Filing Date 11/27/2018	☐ To be Mailed
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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(i))	minus 20 = *		x	\$ 100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 = *		x	\$ 460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

	(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	03/01/2021	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 23	Minus	** 24	= 0	x \$ 100 =	0
	Independent (37 CFR 1.16(h))	* 4	Minus	*** 4	= 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		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x \$ 0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x \$ 0 =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.						LIE	
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".						/ROLITA M WIMBUSH/	
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".							
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.							

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

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/201,903	11/27/2018	Keith George Ferry	67838.00217	1052
125632	7590	10/29/2020		
Snell & Wilmer (LA) 400 East Van Buren Street One Arizona Center Phoenix, AZ 85004			EXAMINER TESKIN, FRED M	
			ART UNIT 1762	PAPER NUMBER
			NOTIFICATION DATE 10/29/2020	DELIVERY MODE 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):

IPLADOCKET@swlaw.com
glangton@swlaw.com
lcoyle@swlaw.com

DETAILED ACTION

Status of Application

This action is responsive to continuing application filed 11/27/2018 as a continuation of prior pending Application No. 15/139,272. Upon entry of the preliminary amendment filed 02/19/2019, claims 1-12, 14, 18, 19 and 21-29 are currently pending and under examination herein.

Notice of Pre-AIA or AIA Status

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

Information Disclosure Statement(s)

The information disclosure statement(s) (IDS) filed on 12/26/2019 and 05/19/2020 are in compliance with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609, and therefore the information referred to therein has been considered as to the merits. Initialed copies of the IDS are included with the mailing of this Office action.

Claim Rejections – 35 U.S.C. 112

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.

Claim 9 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 applications subject to pre-AIA 35 U.S.C. 112, the applicant), regards as the invention.

Regarding Claim 9, the claim provides the limitation to “the cavity”. There is no proper and sufficient antecedent basis for this limitation in the claim, or in any claim upon which claim 9 depends (currently, claim 1).

Claim Rejections – 35 U.S.C. 102

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

A person shall be entitled to a patent unless –

(a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention.

Claims 1, 11 and 19 and are rejected under 35 U.S.C. 102(a)(1) as being anticipated by DeTrano et al (US 5300164; hereinafter, ‘DeTrano’).

As to claim 1, DeTrano discloses a display assembly (FIGS. 1 -4: applique **20**) for attachment with a vulcanized rubber article (Col. 1, lines 57-59) comprising:

an outer layer (FIGS 2-4: outer or visible layer **21**) of elastomeric material having a visual feature (Col. 3, lines 21-25, 35-37; Col. 4, lines 1-20); and

an adhesive layer adhered to an interface surface of the outer layer (FIG. 3: adhesive layer **24**), wherein one or both of the outer layer or the adhesive layer has a barrier material composition (Col. 4, line 33: the barrier layer may [be] an adhesive layer; and Col. 6, lines 31-35: the adhesive layer, such as adhesive layer **24**, may also function as a barrier layer in a manner similar to barrier layer **22**. The adhesives discussed hereinabove may have barrier properties to prevent staining of visible layer **12**), and wherein the adhesive layer is formed from a material capable of chemically bonding with a surface of a vulcanized rubber article (Col. 5, lines 46-51).

As to claim 11, DeTrano further discloses a method for attaching a display assembly (**20**) to a surface (**12**) of a vulcanized rubber article (Fig. 1: tire **10**) comprising the steps of:

identifying a surface of a vulcanized rubber article (Col. 7, lines 44-46);

placing an assembly into contact with the identified surface (Col. 7, lines 52-55), wherein the assembly comprises:

an outer layer (FIGS 2-4: outer or visible layer **21**) of elastomeric material, wherein the outer layer is in contact with an adhesive layer interposed between the prepared surface assembly that bonds the assembly to the vulcanized rubber article (Col. 7, lines 52-53), wherein one of the outer layer or adhesive layer comprise a barrier material composition (Col. 4, line 33: the barrier layer may [be] an adhesive layer; and Col. 6, lines 31-35: the adhesive layer, such as adhesive layer **24**, may also function as a barrier layer in a manner similar to barrier layer **22**. The adhesives discussed hereinabove may have barrier properties to prevent staining of visible layer **12**).

As to claim 19, DeTrano further discloses a vulcanized rubber tire comprising:

a target surface disposed along a portion of the rubber tire (Fig. 1: sidewall **12**; Fig. 3: channel **32**);

an assembly disposed onto the target surface and comprising:

an outer layer of elastomeric material (FIGS 2-4: outer or visible layer **21**);

an adhesive layer connected with the outer layer (FIG. 3: adhesive layer **24**);

wherein one or both of the outer layer or the adhesive layer has a barrier material composition (Col. 4, line 33: the barrier layer may [be] an adhesive layer; and Col. 6, lines 31-35: the adhesive layer, such as adhesive layer **24**, may also function as a barrier layer in a manner similar to barrier layer **22**. The adhesives discussed hereinabove may have barrier properties to prevent staining of visible layer **12**).

Common Ownership Notice

This application currently names joint inventors. In considering patentability of the claims the examiner presumes that the subject matter of the various claims was commonly owned as of the effective filing date of the claimed invention(s) absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and effective filing dates of each claim that was not commonly owned as of the effective filing date of the later invention in order for the examiner to consider the applicability of 35 U.S.C. 102(b)(2)(C) for any potential 35 U.S.C. 102(a)(2) prior art against the later invention.

Claim Rejections – 35 U.S.C. 103

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

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

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

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 2-5, 10, 12 and 14 are rejected under 35 U.S.C. 103 as being unpatentable over DeTrano.

As to claims 2, 3 and 10, DeTrano indicates the possibility of more than one decorative visible layer (corresponding to claimed display layers) and states that visible layer **21** may be provided with a plurality of colors, designs, markings, textures, lettering or the like (Col. 3, lines 25-29, 40-45). In light of this disclosure, it would have been obvious to one of ordinary skill in the art at the time of filing to provide such decoration by conventional means, as by printing a layer on top of visible layer **21**, such additional layer having a different color than the layer **21** and not completely covering the layer **21**.

As to claim 4, DeTrano indicates the possibility of more than one decorative visible layer (corresponding to claimed intermediate layer) (Col. 3, lines 25-29). To secure the further decorative visible layer on the visible layer **21** by means of an intermediate layer interposed therebetween would have been obvious to one of ordinary skill in the art as involving the mere duplication of adhesive layer **24** as shown in FIGS. 3 and 4 of DeTrano; indeed, it has been held that mere duplication of parts has no patentable significance unless a new and unexpected result is produced (MPEP 2144.04 (VI)B).

As to claim 5, DeTrano discloses that the barrier material composition impairs migration of a material constituent within the assembly (Col. 6, lines 31-35: the adhesive layer, such as adhesive layer **24**, may also function as a barrier layer in a manner similar to barrier layer **22**. The adhesives discussed hereinabove may have barrier properties to prevent staining of visible layer **12**).

As to claims 12 and 14, DeTrano discloses the method of claim 11 as discussed above. DeTrano further teaches claimed steps of preparing the identified surface before the step of placing (Col. 7, lines 34-37); applying pressure to the display assembly after the step of placing (Col. 6, lines 16-18).

Claim 6 is rejected under 35 U.S.C. 103 as being unpatentable over DeTrano as applied to claim 1 above, and further in view of Miyazaki et al (US 6235376 B1; hereinafter, 'Miyazaki').

As to claim 6, DeTrano discloses a display assembly as per claim 1 as discussed above. The teachings of DeTrano differ from the claimed invention in that DeTrano fails to disclose a protective

layer disposed over the outer layer and forming an outermost layer surface of the assembly, the protective layer formed from an optically transparent material. However, the use of a protective layer (12) in a display assembly (10) for application to the sidewall surface of a rubber tire (42), wherein the protective layer (12) may be transparent, is well known in the art as taught by Miyazaki (FIG. 1; Col. 3, lines 9-11; Col. 9, lines 1-16 and Col. 10, lines 48-50). It would have been obvious to one of ordinary skill in the art at the time of filing to modify DeTrano by disposing a protective layer as per Miyazaki over the visible layer (21) of the applique (20), as such modification merely involves the straightforward use of a known element to perform its previously established function in an analogous context. Indeed, the selection of a known element/material based on its suitability for its intended use has been held to be prima facie obvious (see MPEP 2144.07).

Claims 7-9, 18 and 21-29 rejected under 35 U.S.C. 103 as being unpatentable over DeTrano as applied to claims 1 and 19 above, and further in view of Parsons (US 2005/0059308 A1).

As to Claims 7-9, 18 and 21-25, DeTrano discloses an assembly as per claim 1 as discussed above. The teachings of DeTrano differ from the claimed invention in that DeTrano fails to disclose a display assembly further comprising a cavity disposed therein (per claims 7, 21, 24). However, the purpose of the cavity is to accept an object or element (e.g., a RFID element as per page 17, final paragraph herein) as specified in claim 8, 18 and 22. In this regard, it is known from Parsons to integrate a RFID element (24) in a label for mounting on a surface of a tire, wherein the element is positioned in a cavity formed in the adhesive layer (22) beneath the display layer (20) (Figures 2, 3). Parsons further teaches the desirability of applying labels to a cured tire (para [0004]), which is consistent with the main object of DeTrano (*cf.* Col. 1, lines 10-12, 48-49). It would have been obvious to one of ordinary skill in the art at the time of filing to modify DeTrano by providing a cavity in adhesive layer (24) for disposing a RFID element therein as per Parsons. The motivation to do so and a reasonable expectation of success

comes from the predictable enhancement of identifying indicia in applique (**20**) of DeTrano by inclusion of a RFID element positioned in a cavity formed in adhesive layer (**24**), wherein the cavity is disposed beneath visible layer (**21**) (hence, beneath the outer layer, per claims 9, 23 and 25).

As to Claim 26, DeTrano in view of Parson render obvious an assembly for attachment to a vulcanized rubber tire as per claim 24 as discussed above. DeTrano further discloses wherein the adhesive layer is connected to the outer layer (e.g., via barrier layer **22**, which may be an adhesive layer as per Col. 4, lines 31-34).

As to Claim 27, DeTrano in view of Parson render obvious an assembly for attachment to a vulcanized rubber tire as per claim 24 as discussed above. DeTrano further discloses wherein the outer layer includes an indicia along an outer surface (Col. 3, lines 43-45: visible layer **21** may be provided with plurality of colors, designs, markings, textures, lettering ...).

As to Claim 28, DeTrano in view of Parson render obvious an assembly for attachment to a vulcanized rubber tire as per claim 24 as discussed above. DeTrano further discloses wherein one of the outer layer or adhesive layer comprises a barrier material composition (Col. 4, line 33: barrier layer may [be] an adhesive layer; and Col. 6, lines 31-35: the adhesive layer, such as adhesive layer **24**, may also function as a barrier layer in a manner similar to barrier layer **22**. The adhesives discussed hereinabove may have barrier properties to prevent staining of visible layer **12**).

As to Claim 29, DeTrano in view of Parson render obvious an assembly for attachment to a vulcanized rubber tire as per claim 24 as discussed above. DeTrano further discloses an intermediate layer disposed beneath the outer layer (Col. 4, lines 24-25: preferred that visible layer **21** be affixed to an optional, intermediate or barrier layer **22**).

Claim Rejections – Nonstatutory Double Patenting

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 § 2146 *et seq.* 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).

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Claims 24-27 and 29 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-3 and 7-9 of U.S. Patent No. 10,137,741 B2 ('741).

Although the claims at issue are not identical, they are not patentably distinct from each other because they differ merely in matters of scope and/or semantics. In particular, pending claim 24 is directed to an assembly for attachment to a vulcanized rubber tire comprising;

an outer layer formed from an elastomeric material;

an adhesive layer bonding the assembly to portion of a vulcanized elastomeric material; and

a cavity disposed within the assembly for accommodating an element therein.

Claim 1 of '741 is directed to a display assembly for attachment to a vulcanized rubber article (which reads on a vulcanized rubber tire) comprising: one or more display layers of elastomeric material configured to provide a display indicia; an intermediate layer formed from an elastomeric material that is different from that of the one or more display layers, wherein the intermediate layer is in direct contact with at least of the one or more display layers, and wherein the one or more display layers and the intermediate layer are vulcanized together before attachment with the vulcanized rubber article; and an adhesive layer in direct contact with an underside surface of the intermediate layer opposite the one or more display layers, wherein the adhesive layer is formed from a material capable forming a chemical bond with a surface of the vulcanized rubber article at ambient temperature conditions. Further, claim 7 of '741 is drawn to the display assembly as recited in claim 1 further comprising a cavity disposed therein; and claim 8 of '741 is drawn to the display assembly as recited in claim 7 further comprising an element disposed within the cavity.

The listed claims of '741 thus read on the instant assembly in that "one or more display layers of elastomeric material" reads on "an outer layer formed from an elastomeric material"; "an adhesive layer in direct contact with an underside surface of the intermediate layer opposite the one or more display layers, wherein the adhesive layer is formed from a material capable forming a chemical bond

with a surface of the vulcanized rubber article ..." reads on "an adhesive layer bonding the assembly to portion of a vulcanized elastomeric material"; and "a cavity disposed therein ... further comprising an element disposed within the cavity" reads on "a cavity disposed within the assembly for accommodating an element therein" as claimed herein.

As to Claim 25, claim 9 of '741 is drawn to the display assembly as recited in claim 7 wherein the cavity is disposed beneath the one or more display layers (corresponding to instant "outer layer ...").

As to Claim 26, the claim recites that the adhesive layer is connected with the outer layer. This recitation reads on indirect attachment of the adhesive layer with the one or more display layers of the patented display assembly via an intermediate layer as per claim 1 of '741.

As to Claim 27, claim 3 of '741 recites that the first display layer is colored, which would have suggested to one of ordinary skill in the art the provision of an outer layer that includes an indicia along an outer surface as claimed.

As to Claim 29, claim 1 of '741 recites a display assembly further comprising an intermediate layer disposed beneath one or more display layers, which corresponds to "an outer layer" as per claim 24 herein.

Conclusion

No claims are in condition for allowance at this time.

Correspondence

Any inquiry concerning this communication should be directed to Examiner F. M. Teskin whose telephone number is (571) 272-1116. The examiner can normally be reached on Monday through Friday from 9:00 AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gwendolyn Blackwell, can be reached at (571) 272-5772. The appropriate fax phone number for the organization where this application or proceeding is assigned is (571) 270-8743.

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 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.

/FRED M TESKIN/
Primary Examiner, Art Unit 1762

/FMTeskin/10-24-20

<i>Notice of References Cited</i>	Application/Control No. 16/201,903		Applicant(s)/Patent Under Reexamination Ferry et al.	
	Examiner FRED M TESKIN		Art Unit 1762	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-10137741-B2	11-2018	Ferry; Keith George	B29D30/72	1/1
	B					
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Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		16201903
	Filing Date		2018-11-27
	First Named Inventor	Keith George Ferry	
	Art Unit	1762	
	Examiner Name	Fred M. Teskin	
	Attorney Docket Number	67838.00217	

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	1	H05338032	JP	A	1993-12-21	BRIDGESTONE CORP		
	2	2014213718	JP	A	2014-11-17	YOKOHAMA RUBBER CO LTD		×
	3	2004299201	JP	A	2004-10-28	NISSHA PRINTING		☒

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Attorney Docket Number	67838.00217

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First Named Inventor	Keith George Ferry
Art Unit	1762
Examiner Name	Fred M. Teskin
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Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

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See attached certification statement.

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

A certification statement is not submitted herewith.

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

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SERIAL NUMBER 16/201,903	FILING or 371(c) DATE 11/27/2018 RULE	CLASS 428	GROUP ART UNIT 1762	ATTORNEY DOCKET NO. 67838.00217		
APPLICANTS INVENTORS Keith George Ferry, Studio City, CA; Jason Michael Busch, Studio City, CA; ** CONTINUING DATA ***** This application is a CON of 15/139,272 04/26/2016 PAT 10137741 which claims benefit of 62/153,441 04/27/2015 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** ** SMALL ENTITY ** 12/17/2018						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and Acknowledged <u>/FRED M TESKIN/</u> Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY CA	SHEETS DRAWINGS 8	TOTAL CLAIMS 24	INDEPENDENT CLAIMS 4
ADDRESS Snell & Wilmer (LA) 400 East Van Buren Street One Arizona Center Phoenix, AZ 85004 UNITED STATES						
TITLE DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES						
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<i>Search Notes</i> 	Application/Control No. 16/201,903	Applicant(s)/Patent Under Reexamination Ferry et al.
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CPC - Searched*		
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(B60C 13/001, B32B 7/12, B29D 2030/728).CPC. - TEXT LIMITED	10/24/2020	/FT/

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US Classification - Searched*			
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(B60C 13/001, B32B 7/12, B29D 2030/728).CPC. - TEXT LIMITED	10/24/2020	/FT/
PALM INVENTORS SEARCH; REVIEWED PARENT CASE RECORD	10/24/2020	/FT/

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First Named Inventor	Keith George Ferry
Art Unit	1762
Examiner Name	Fred M. Teskin
Attorney Docket Number	67838.00217

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	1	8834974	B1	2014-09-16	Ferry et al.	
	2	4461795	A	1984-07-24	Ogawa	
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	6	5508084	A	1996-04-16	Reeves et al.	
	7	6080465	A	2000-06-27	Boissonnet et al.	
	8	6235376	B1	2001-05-22	Miyazaki et al.	

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Examiner Name	Fred M. Teskin
Attorney Docket Number	67838.00217

9	6391134	B1	2002-05-21	Lipovac
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1		International Search Report dated July 27, 2016 for corresponding International Application No. PCT/US2016/029605 filed April 27, 2016; total 5 pages.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16201903
Filing Date	2018-11-27
First Named Inventor	Keith George Ferry
Art Unit	1762
Examiner Name	Fred M. Teskin
Attorney Docket Number	67838.00217

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /F.M.T/

2	Written Opinion of the International Searching Authority dated July 27, 2016 for corresponding International Application No. PCT/US2016/029605 filed April 27, 2016; total 6 pages.
3	International Preliminary Report on Patentability dated October 31, 2017 for corresponding International Application No. PCT/US2016/029605 filed April 27, 2016; total 7 pages.
4	Non-Final Office Action dated April 5, 2018 in corresponding U.S. Application No. 15/139,272 filed April 26, 2016; total 28 pages.
5	Notice of Allowance dated September 24, 2018 in corresponding U.S. Application No. 15/139,272 filed April 26, 2016; total 5 pages.
6	Examination Report dated October 10, 2019 in corresponding Australian Application No. 2016255775 filed November 27, 2017; total 6 pages.

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Examiner Signature	/FRED M TESKIN/	Date Considered	10/24/2020
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**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	16201903
Filing Date	2018-11-27
First Named Inventor	Keith George Ferry
Art Unit	1762
Examiner Name	Fred M. Teskin
Attorney Docket Number	67838.00217

CERTIFICATION STATEMENT

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

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

OR

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

See attached certification statement.

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

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Grant T. Langton/	Date (YYYY-MM-DD)	2019-12-26
Name/Print	Grant T. Langton	Registration Number	39,739

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<i>Index of Claims</i> 	Application/Control No. 16/201,903	Applicant(s)/Patent Under Reexamination Ferry et al.
	Examiner FRED M TESKIN	Art Unit 1762

✓	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	10/24/2020								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								
	9	✓								
	10	✓								
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	19	✓								
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	24	✓								
	25	✓								
	26	✓								
	27	✓								
	28	✓								
	29	✓								

WEST Search History for Application 16201903

Creation Date: 2020102421:16

Interference Searches

Query	DB	Hits	Op.	Plur.	Thes.	Date
((DISPLAY NEAR2 INDICIA) OR DECAL OR APPLIQUE) AND ((VULCANIZED NEAR1 RUBBER) OR TIRE) AND ((INTERMEDIATE OR BARRIER) NEAR2 LAYER) AND (ADHESIVE NEAR2 LAYER)).CLM.	PGPB	1	OR	YES		10-24-2020

Prior Art Searches

Query	DB	Hits	Op.	Plur.	Thes.	Date
(B32B 7/12)! [CPC, CPCL]	PGPB, USPT, USOC	136359	OR	YES		10-24-2020
B60C 13/001	PGPB, USPT, USOC	24905	OR	YES		10-24-2020
(B60C 13/001) AND ((B32B 7/12)! [CPC, CPCL])	PGPB, USPT, USOC	321	OR	YES		10-24-2020
(B60C 13/001 AND (B32B 7/12)! [CPC, CPCL]) AND (INTERMEDIATE NEAR2 LAYER)	PGPB, USPT, USOC	43	OR	YES		10-24-2020
(B60C 13/001 AND (B32B 7/12)! [CPC, CPCL]) AND (APPLIQUE OR DECAL OR DISPLAY)	PGPB, USPT, USOC	35	OR	YES		10-24-2020
B29D 2030/728	PGPB, USPT, USOC	20935	OR	YES		10-24-2020
(B29D 2030/728) AND ((B32B 7/12)! [CPC, CPCL])	PGPB, USPT, USOC	2122	OR	YES		10-24-2020
(B29D 2030/728 AND (B32B 7/12)! [CPC, CPCL]) AND ((APPLIQUE OR INDICIA OR DECAL) NEAR6 (ELASTOMER OR ELASTOMERIC OR RUBBER))	PGPB, USPT, USOC	6	OR	YES		10-24-2020

((428/914))![CCLS]	PGPB, USPT, USOC	3992	OR	YES		10-24-2020
((156/240))![CCLS]	PGPB, USPT, USOC	1268	OR	YES		10-24-2020
((156/116))![CCLS]	PGPB, USPT, USOC	197	OR	YES		10-24-2020
((((DISPLAY NEAR1 INDICIA) OR DECAL OR APPLIQUE) AND (VULCANIZED RUBBER OR TIRE) AND (INTERMEDIATE NEAR2 LAYER) AND (ADHESIVE NEAR2 LAYER)).CLM.	PGPB	3	OR	YES		10-24-2020
((((DISPLAY NEAR1 INDICIA) OR DECAL OR APPLIQUE) AND ((VULCANIZED NEAR1 RUBBER) OR TIRE) AND (INTERMEDIATE NEAR2 LAYER) AND (ADHESIVE NEAR2 LAYER)).CLM.	PGPB	1	OR	YES		10-24-2020
(((((DISPLAY NEAR1 INDICIA) OR DECAL OR APPLIQUE) AND ((VULCANIZED NEAR1 RUBBER) OR TIRE) AND (INTERMEDIATE NEAR2 LAYER) AND (ADHESIVE NEAR2 LAYER)).CLM.) and @pd > 20180917	PGPB	0	OR	YES		10-24-2020



Espacenet

Bibliographic data: JP2008197887 (A) — 2008-08-28

RFID ADHESIVE LABEL

Inventor(s): ITO HIROAKI ± (ITO HIROAKI)
Applicant(s): TAC KASEI KK ± (TAC KASEI KK)
Classification: - **international:** G06K19/07; G06K19/077; G09F3/00
- **cooperative:**
Application number: JP20070031924 20070213 Global Dossier
Priority number(s): JP20070031924 20070213

Abstract of JP2008197887 (A)

PROBLEM TO BE SOLVED: To obtain an RFID adhesive label which protects an IC chip against excessive pressure or load to an IC chip effectively, and at the same time does not cause difficulty in passing paper to a printer. ;SOLUTION: The RFID adhesive label comprises: a surface substrate 11; a first adhesive agent 15; an inlay 30 of which one side surface 32 is attached with an IC chip 31; a second adhesive agent 21; and release paper 22. The release paper 22 is partitioned to a clearance holding area 23 and an exfoliation area 24 by a cutting line 26, and has a second through hole 25 clipped by the IC chip size in the clearance holding area 23. The inlay 30 is adhered to an undersurface 12 of the surface substrate through the first adhesive agent 15; the release paper 22 is temporarily adhered to the surface substrate and an inlay adhesive item through the second adhesive agent 21, and the IC chip 31 is positioned in the second through hole 25. ;COPYRIGHT: (C)2008,JPO&INPIT

(19) 日本国特許庁 (JP) (12) 公開特許公報 (A) (11) 特許出願公開番号
特開2008-197887
(P2008-197887A)
(43) 公開日 平成20年8月28日 (2008.8.28)

(51) Int. Cl.	F 1	テーマコード (参考)
G 0 6 K 19/077 (2006.01)	G 0 6 K 19/00 K	5 B 0 3 5
G 0 9 F 3/00 (2006.01)	G 0 9 F 3/00 M	
G 0 6 K 19/07 (2006.01)	G 0 6 K 19/00 H	

審査請求 未請求 請求項の数 6 O L (全 14 頁)

(21) 出願番号 特願2007-31924 (P2007-31924)	(71) 出願人 302071782
(22) 出願日 平成19年2月13日 (2007.2.13)	タック化成株式会社
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	愛媛県四国中央市川之江町長瀬222番地 の2 タック化成株式会社内
	Fターム (参考) 5B035 AA07 BA04 BA05 BB09 CA02 CA23

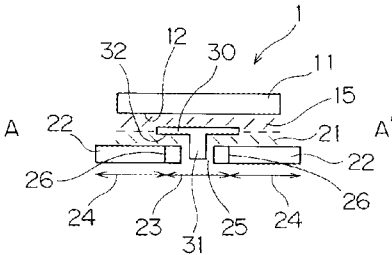
(54) 【発明の名称】 R F I D 粘着ラベル

(57) 【要約】

【課題】 I C チップに対する過剰な圧力や荷重から I C チップを効果的に保護すると同時に、プリンターへの通紙に困難を生じない R F I D 粘着ラベルを得る。

【解決手段】 R F I D 粘着ラベル 1 は、表面基材 1 1、第一粘着剤 1 5、一方表面 3 2 に I C チップ 3 1 が取り付けられたインレイ 3 0、第二粘着剤 2 1 と剥離紙 2 2 からなり、前記剥離紙 2 2 は切断線 2 6 により隙間保持領域 2 3 と剥離領域 2 4 に区画され、前記隙間保持領域 2 3 に前記 I C チップの大きさに切り抜かれた第二貫通穴 2 5 を有し、前記表面基材の下面 1 2 に、第一粘着剤 1 5 を介して前記インレイ 3 0 が貼着され、表面基材とインレイ貼着物に第二粘着剤 2 1 を介して前記剥離紙 2 2 が仮着され、前記 I C チップ 3 1 は、第二貫通穴 2 5 に位置付けられている。

【選択図】 図 2



【特許請求の範囲】

【請求項 1】

R F I D 粘着ラベルにおいて、

表面基材、第一粘着剤、一方表面に I C チップが取り付けられたインレイ、第二粘着剤と剥離紙からなり、

前記剥離紙は切断線により隙間保持領域と剥離領域に区画され、前記隙間保持領域に前記 I C チップの大きさに切り抜かれた第二貫通穴を有し、

前記表面基材の下面に、第一粘着剤を介して前記インレイが貼着され、

表面基材とインレイ貼着物に第二粘着剤を介して前記剥離紙が仮着され、前記 I C チップは第二貫通穴に位置付けられた R F I D 粘着ラベル。

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【請求項 2】

R F I D 粘着ラベルにおいて、

表面基材、第一粘着剤、一方表面に I C チップが取り付けられたインレイ、第三粘着剤、前記 I C チップの大きさに切り抜かれた第一貫通穴を有する離間シート、第二粘着剤と剥離紙からなり、

前記剥離紙は切断線により隙間保持領域と剥離領域に区画され、前記隙間保持領域に前記 I C チップの大きさに切り抜かれた第二貫通穴を有し、

前記表面基材の下面に第一粘着剤を介して前記インレイが貼着され、

表面基材とインレイ貼着物が、第三粘着剤を介して前記離間シートの上面に貼着され、前記 I C チップは第一貫通穴に位置付けられ、

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前記離間シートの下面に第二粘着剤を介して剥離紙が仮着され、前記 I C チップは、第二貫通穴に位置付けられた R F I D 粘着ラベル。

【請求項 3】

前記離間シートがポリエチエレンテレフタレート製である請求項 2 に記載の R F I D 粘着ラベル。

【請求項 4】

請求項 1 乃至 3 いずれかに記載した R F I D 粘着ラベルを準備し、

プリンターにより前記表面基材に情報を印字し、次に、

前記剥離紙の前記剥離領域を取り除き、前記取り除きにより露出する第二粘着剤により、被着物に、R F I D 粘着ラベルを貼り付ける R F I D 粘着ラベルの貼着方法。

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【請求項 5】

以下の工程よりなる R F I D 粘着ラベルの製造方法。

イ. 表面基材の下面に第一粘着剤を塗布した第一原料粘着シートを準備する工程。

ロ. 表面基材の下面に第一粘着剤を介して、一方表面に I C チップが取り付けられたインレイを貼着し、表面基材とインレイ貼着物を得る工程。

ハ. 離間シートの上面に第三粘着剤を塗布し、前記離間シートの下面に第二粘着剤を塗布し、第二粘着剤を介して剥離紙を仮着した第二原料両面粘着シートを準備し、前記剥離紙を切断線により切断し、前記剥離紙を前記切断線により隙間保持領域と剥離領域に区画する工程。

ニ. ハの工程により得られた切断済第二原料両面粘着シートにおける隙間保持領域内に、剥離紙と離間シートを貫通し、前記 I C チップの大きさの貫通穴を空ける工程。

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ホ. ロの工程により得られた表面基材とインレイ貼着物と、ニの工程のより得られた穴空き切断済第二原料両面粘着シートを貼り合わせ、前記 I C チップを前記貫通穴に位置付けて、R F I D 粘着ラベルを得る工程。

【請求項 6】

前記表面基材の上面に第一位置表示マークが印刷され、前記剥離紙の下面に第二位置表示マークが印刷されていて、第一位置表示マークを検出するとともに、第二位置表示マークを検出し、ホの貼り合わせ工程が両者の貼り合わせ位置を合致させて行われる請求項 5 に記載した R F I D 粘着ラベルの製造方法。

【発明の詳細な説明】

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【技術分野】

【0001】

本発明はRFID粘着ラベルに関するものである。

【背景技術】

【0002】

表面基材への印字ムラを防ぎ、また、トランスポンダーの位置が探知されないように、従来、マスク材を備えたRFIDスマートラベルが提案されている。すなわち、従来のマスク材を備えたRFIDスマートラベル101は、図10にその断面を示すように、表面基材111、穴114を空けたマスク材113、突出部が上述の穴114に位置付けられたトランスポンダー130とライナー122が積層されている。マスク材113の上面と下面には、粘着剤112が位置している。（例えば、特許文献1参照。）

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【0003】

【特許文献1】米国特許US6294998号公報

【発明の開示】

【発明が解決しようとする課題】

【0004】

RFID粘着ラベルは、製造された後、表面基材への印刷、電子データの書き込み、物品への貼付けなどが行われる。

【0005】

従来のマスク材を備えたRFID粘着ラベルは、ICチップへの不測の荷重を防ぐために、ICチップの厚さに応じてマスク材を厚くしなければならなかった。このためICチップの厚さが大きくなると、必然的にRFID粘着ラベル全体の厚さが大きくなり、プリンターへの通紙が困難になるという新たな問題点が発生した。

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【0006】

例えば、新聞原紙など、紙原紙のロール外周に従来のマスク材を備えたRFID粘着ラベルを貼り付けた状態で、当該ロールを転がして移動させると、ICチップに過度な重量あるいは圧力がかかり、ICチップにクラックが生じるなどしてRFID機能が破壊される。ここで、マスク材を厚くする対策をすれば、RFID粘着ラベル全体の厚さが厚くなる結果、プリンターへの通紙が困難になる。

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【0007】

そこで、本発明は、ICチップに対する過剰な圧力や荷重からICチップを効果的に保護すると同時に、プリンターへの通紙に困難を生じないRFID粘着ラベルを得ることを課題とする。

【0008】

また、本発明は、同様なRFID粘着ラベルの貼付け方法を得ることを課題とする。

【0009】

さらに本発明は、製造工程においてインレイに不測の損傷を与えることなく、ICチップを効果的に保護すると同時にプリンターへの通紙に困難を生じないRFID粘着ラベルの製造方法を提供することを課題とする。

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【0010】

本発明のその他の課題は、本発明の説明により明らかになる。

【課題を解決するための手段】

【0011】

課題を解決するための手段を説明する。理解を容易にするために、本発明の実施態様に対応する符号を付けて説明するが、本発明は当該実施態様に限定されるものではない。

【0012】

本発明の一の態様にかかるRFID粘着ラベル1は、表面基材11、第一粘着剤15、一方表面32にICチップ31が取り付けられたインレイ30、第二粘着剤21と剥離紙22からなり、前記剥離紙22は切断線26により隙間保持領域23と剥離領域24に区画され、前記隙間保持領域23に前記ICチップの大きさに切り抜かれた第二貫通穴25

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を有し、前記表面基材の下面12に、第一粘着剤15を介して前記インレイ30が貼着され、表面基材とインレイ貼着物に第二粘着剤21を介して前記剥離紙22が仮着され、前記ICチップ31は、第二貫通穴25に位置付けられている。

【0013】

本発明の他の態様にかかるRFID粘着ラベル2は、表面基材11、第一粘着剤15、一方表面32にICチップ31が取り付けられたインレイ30、第三粘着剤19、前記ICチップの大きさに切り抜かれた第一貫通穴20を有する離間シート16、第二粘着剤21と剥離紙22からなり、前記剥離紙22は切断線26により隙間保持領域23と剥離領域24に区画され、前記隙間保持領域23に前記ICチップの大きさに切り抜かれた第二貫通穴25を有し、前記表面基材の下面12に第一粘着剤15を介して前記インレイ30が貼着され、表面基材とインレイ貼着物が、第三粘着剤19を介して前記離間シート16の上面17に貼着され、前記ICチップ31は第一貫通穴20に位置付けられ、前記離間シート16の下面18に第二粘着剤21を介して剥離紙22が仮着され、前記ICチップ31は第二貫通穴25に位置付けられている。

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【0014】

本発明の好ましい実施態様にあつては、前記離間シート22がポリエチエレンテレフタレート製であってもよい。ポリエチエレンテレフタレート（以下「PET」という）シートは、荷重に対する寸法安定性に優れるので、第一貫通穴内にICチップを保持し、荷重からICチップを保護するにふさわしい。

【0015】

もっとも、本発明において、離間シートの材質は、紙、合成紙、不織布や合成樹脂などであってもよい。

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【0016】

本発明の他の態様にかかるRFID粘着ラベルの貼着方法は、本発明にかかるRFID粘着ラベルを準備し、プリンターにより前記表面基材に情報を印字し、次に、前記剥離紙の前記剥離領域を取り除き、前記取り除きにより露出する第二粘着剤により、被着物に、RFID粘着ラベルを貼り付けるものである。

【0017】

本発明の他の態様にかかるRFID粘着ラベル2の製造方法は以下の工程よりなる。
イ、表面基材の下面に第一粘着剤を塗布した第一原料粘着シートを準備する工程。
ロ、表面基材の下面に第一粘着剤を介して、一方表面にICチップが取り付けられたインレイを貼着し、表面基材とインレイ貼着物を得る工程。
ハ、離間シートの上面に第三粘着剤を塗布し、前記離間シートの下面に第二粘着剤を塗布し、第二粘着剤を介して剥離紙を仮着した第二原料両面粘着シートを準備し、前記剥離紙を切断線により切断し、前記剥離紙を前記切断線により隙間保持領域と剥離領域に区画する工程。
ニ、ハの工程により得られた切断済第二原料両面粘着シートにおける隙間保持領域内に、剥離紙と離間シートを貫通し、前記ICチップの大きさの貫通穴を空ける工程。
ホ、ロの工程により得られた表面基材とインレイ貼着物と、ニの工程のより得られた穴空き切断済第二原料両面粘着シートを貼り合わせ、前記ICチップを前記貫通穴に位置付けて、RFID粘着ラベルを得る工程。

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【0018】

本発明の好ましい実施態様にあつては、前記表面基材の上面に第一位置表示マークが印刷され、前記剥離紙の下面に第二位置表示マークが印刷されていて、第一位置表示マークを検出するとともに、第二位置表示マークを検出し、ホの貼り合わせ工程が両者の貼り合わせ位置を合致させて行われるRFID粘着ラベルの製造方法であってもよい。

【0019】

以上説明した本発明、本発明の好ましい実施態様、これらに含まれる構成要素は可能な限り組み合わせる実施することができる。

【発明の効果】

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【0020】

本発明のRFID粘着ラベルは、剥離紙に第二貫通穴を設け、ICチップを当該第二貫通穴内に位置付けた。よって、表面基材への情報印刷時と被着物への貼付け時に、RFID粘着ラベルの最大厚さが変わらない。つまり、剥離紙の厚さをそのまま、ICチップ保護の間隔として使用でき、ICチップに対する過剰な圧力や荷重からICチップを効果的に保護すると同時に、プリンターへの通紙に困難を生じないRFID粘着ラベルである。さらに、特別の離間シートを必要とせず、簡易な構成でICチップの荷重対策を施したものである。

【0021】

本発明の他の態様にかかるRFID粘着ラベルは、剥離紙に第二貫通穴を設け、さらに、離間シートに第一貫通穴を設け、ICチップを当該第二貫通穴と第一貫通穴内に位置付けた。よって、剥離紙の厚さに加えて、離間シートの厚さをICチップ保護のための厚みとして使用できる。また、剥離紙と離間シートの材質を異ならせれば、例えば、剥離紙は厚さの安定性を重視してPETとし、離間シートは衝撃吸収性を重視して不織布とするなどにより、より、ICチップの保護に優れたRFID粘着ラベルとなる。同時に、RFID粘着ラベル全体の厚さが節約でき、プリンターへの通紙が容易化される。

【0022】

本発明にかかるRFID粘着ラベルの貼付け方法は、離間シートと剥離紙に設けた間隔保持領域の両者の厚さによりインレイのICチップの突出高さを保護したRFID粘着ラベルを用いるので、貼付け前にプリンターへの通紙が容易であり、また、貼付け後には大きな荷重がかかっても壊れないRFID粘着ラベルの貼付け方法である。

【0023】

本発明にかかるRFID粘着ラベルの製造方法は、離間シートとして、両面粘着シートを使用したので、インレイに糊を塗布するなどインレイに不測の衝撃がかかる工程が無い。また、剥離紙と両面粘着シートに同時に貫通穴を空けるので、手間がかからず、また、第二貫通穴と第一貫通穴を一致させる工程も不要となり、製造工程でICチップが破損する事故も減少する。このため、簡略、安価な工程により、ICチップを荷重から保護し、同時にプリンターへの通紙も容易なRFID粘着ラベルを製造する方法である。

【発明を実施するための最良の形態】

【0024】

以下、図面を参照して本発明の実施例にかかるRFID粘着ラベル、RFID粘着ラベルの貼着方法、RFID粘着ラベルの製造方法をさらに説明する。本発明の実施例に記載した部材や部分の寸法、材質、形状、その相対位置などは、とくに特定の記載のない限りは、この発明の範囲をそれらだけに限定する趣旨のものではなく、単なる説明例にすぎない。また、本実施例にかかる図面は、本発明の特徴を理解しやすくするため、寸法比率を無視して作成している。

【0025】

(第一のRFID粘着ラベル1)

【0026】

まず、第一のRFID粘着ラベル1の構成を説明する。

【0027】

図1はRFID粘着ラベル1の平面図であり、図2は図1のA-A'線で切断したRFID粘着ラベル1の断面図、図3はRFID粘着ラベル1の底面図である。

【0028】

第一のRFID粘着ラベル1は、表側より順に、表面基材11、第一粘着剤15、インレイ30、第二粘着剤21と剥離紙22がこの順に積層されている。インレイ30は、例えばポリエチレンテレフタレート(PET)などのフィルム上に、アンテナとアンテナに連結されたICチップ31が固定されたRFIDの回路単位をいう。アンテナが形成されたフィルムの片面の一部分に、当該片面から突出する形態で、ICチップが取り付けられている。本発明において、ICチップ31が取り付けられた一方表面32をRFID粘着

ラベルの剥離紙側（ラベルの下側）に位置付けている。

【0029】

剥離紙22は切断線26により隙間保持領域23と剥離領域24に区画されている。図2において、隙間保持領域を線分23で示し、また、剥離領域を線分24で示している。切断線26はいわゆる抜き加工線であり、剥離紙22は切断線26により完全に切断されているが、隙間保持領域23と剥離領域24の両者が、共に、表面基材11に直接に、あるいはインレイ30を通じて表面基材に間接に貼着されているため、剥離紙22はシート形態を保持している。

【0030】

隙間保持領域23は、第二貫通穴25を有している。第二貫通穴25は、ICチップ31がその中に位置付けられる部分である。このため、第二貫通穴25の大きさの下限は、ICチップ30が外接する大きさである。例えば、第二貫通穴が円形の場合には、ICチップ31の外接円の直径に加工上必要な余裕寸法（例えば直径+余裕寸法（例えば0.5mm））を加算したものである。第二貫通穴の大きさの上限は、通常は特に定まった値はない。しかし、荷重からのICチップ保護の観点から、前記直径の下限値に通常5mmを加えた直径の円以下、好ましくは3mmを加えた直径の円以下である。第二貫通穴は、円形のほかに、例えば方形でもよく、方形の大きさは、前記円形の場合に準じて定めればよい。

【0031】

表面基材11の下面12に、第一粘着剤15を介して前記インレイ30が貼着されている。表面基材とインレイ貼着物に第二粘着剤21を介して剥離紙22が仮着され、ICチップ31は第二貫通穴25内に位置付けられている。よって、ICチップ31の突出高さは、剥離紙22の厚さに隠れる。

【0032】

通常、インレイ30の平面大きさは、表面基材11の平面大きさと同じか、又は、表面基材11よりも小さい。インレイが存在する部分では、積層状態は、表面基材11、第一粘着剤15、インレイ30、第二粘着剤21と剥離紙22となる。インレイの存在しない部分では、積層状態は、表面基材11、第一粘着剤15、第二粘着剤21と剥離紙22となる。つまり、第一粘着剤15と第二粘着剤21が直接接している。

【0033】

以上のように構成したので、第一のRFID粘着ラベル1は以下のような利点を有する。

(1) 剥離紙の厚さがそのままICチップを荷重から保護するための厚さとなる。従来のマスク材を備えたRFID粘着ラベルにあっては、マスク材を厚くしてICチップを保護し、さらに仮着された剥離紙の厚さを含む全体として、プリンターに通紙した。ここで剥離紙は被着物への貼付け前に破棄されるものであった。対して、本発明にかかる第一のRFID粘着ラベルは、全体厚さをICチップ保護のために使用可能であり、プリンターの通紙が容易となる。

(2) マスク材なしで、ICチップ保護のための隙間を保持できるため、従来のマスク材を備えたRFID粘着ラベルに比較して、構成が簡略化、材料が減少する。このため、生産工程が簡略化し、製造費用が安価となる。

【0034】

（第二のRFID粘着ラベル2）

【0035】

続いて、他の実施例にかかる第二のRFID粘着ラベル2の構成を説明する。

【0036】

図4はRFID粘着ラベル2の平面図であり、図5は図4のB-B'線で切断したRFID粘着ラベル2の断面図、図6は図4のC-C'線で切断したRFID粘着ラベル2の断面図、図7はRFID粘着ラベル1の底面図である。第二のRFID粘着ラベル2において、第一のRFID粘着ラベル1と同様な構成部品や部分には、同一の符号を付してい

る。以下では、第一のRFID粘着ラベルと異なる点を主として説明する。

【0037】

第二のRFID粘着ラベル2は、表面基材11、第一粘着剤15、インレイ30、第三粘着剤19、離間シート16、第二粘着剤21と剥離紙22が、この順に積層されたものである。

【0038】

すなわち、概説すれば、第一のRFID粘着ラベルに、離間シート16を加えたものである。

【0039】

離間シート16はICチップ31の大きさに切り抜かれた第一貫通穴20を有する。第一貫通穴20は、ICチップ31がその中に位置付けられる部分である。第一貫通穴の大きさ、形状などは、第一のRFID粘着ラベルにおける第二貫通穴の大きさ、形状と同じである。

【0040】

離間シート16の材質は、ポリエチレンテレフタレートが好適に使用できる。荷重がかかっても、厚さが変化し難いからである。しかし、紙、合成紙、不織布などであってもよい。不織布は、間隔保持及び／又は衝撃吸収の目的で使用することができる。

【0041】

離間シート16は、シート材料の片面に第三粘着剤19を塗布し、他方の面に第二粘着剤を塗布した両面粘着シートを使用して、表面基材とインレイ貼着物に貼り付けて形成してもよい。このようにすれば、例えば、インレイに第三粘着剤19を塗布する作業が不要となり、インレイに不測の衝撃などが作用する機会を減少することができる。

【0042】

また、離間シート16と剥離紙22は、前記の両面粘着シートに剥離紙を仮着したシートを準備し、これに、第二貫通穴と第一貫通穴を同時一度に空ける加工を施してもよい。その後、これと表面基材とインレイ貼着物を貼り付ける。このようにすれば、第一貫通穴と第二貫通穴の位置を合わせる手間を省くことができる。ひいては位置合わせに失敗し、ICチップを損傷する事態を防ぐことができる。

【0043】

以下、第一RFID粘着ラベルと同様な構成部分を簡略に説明する。

【0044】

剥離紙22は、切断線26により、隙間保持領域23と剥離領域24に区画されている。

【0045】

図5と図6においては、隙間保持領域を線分23で示し、また、剥離領域を線分24で示している。切断線26はいわゆる抜き加工線であり、剥離紙22は切断線26により完全に切断されているが、隙間保持領域23と剥離領域24の両者が、共に、離間シート16に貼着されているため、剥離紙22はシート形態を保持している。

【0046】

隙間保持領域23はICチップ31の大きさに切り抜かれた第二貫通穴25を有する。第二貫通穴25は、ICチップ31がその中に位置付けられる部分である。第二貫通穴の大きさの下限と上限及び好ましい範囲は、第一のRFID粘着ラベルにおける第二貫通穴20の大きさの下限と上限及び好ましい範囲と同じである。

【0047】

表面基材11の下面12に第一粘着剤15を介してインレイ30が貼着されている。インレイ30は、ICチップ31が取り付けられた一方表面32をRFID粘着ラベルの剥離紙22側（ラベルの下側）に位置付けている。

【0048】

表面基材とインレイ貼着物が、第三粘着剤19により離間シート16の上面17に貼着されている。ICチップ31は第一貫通穴20内に位置付けられる。よって、ICチップ

の突出高さの一部は、離間シート 16 の厚さに隠れる。

【0049】

離間シート 16 の下面 18 に第二粘着剤 21 を介して剥離紙に仮着されている。IC チップ 31 は第二貫通穴 25 内に位置付けられる。IC チップの突出高さの一部、すなわち離間シート 16 の厚さに隠れない高さ部分は、剥離紙の厚さに隠れる。

【0050】

もっとも、IC チップの突出高さよりも離間シート 16 の厚さを厚くしてもよい。この場合には剥離紙の厚さは、IC チップを過重から保護する予備的な厚さとして作用する。あるいは、衝撃吸収を主目的として剥離紙（又は離間シート）の厚さを使用することもできる。

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【0051】

通常、インレイ 30 の平面大きさは、表面基材 11 の平面大きさと同じか、又は、表面基材 11 よりも小さい。インレイが存在する部分では、断面の積層状態は、表面基材 11、第一粘着剤 15、インレイ 30、第三粘着剤 19、離間シート 16、第二粘着剤 21 と剥離紙 22 となる。インレイの存在しない部分では、断面の積層状態は、表面基材 11、第一粘着剤 15、第三粘着剤 19、離間シート 16、第二粘着剤 21 と剥離紙 22 となる。つまり、第一粘着剤 15 と第三粘着剤 19 が直接接している。

【0052】

以上のように構成したので、第二のRFID粘着ラベル2は以下のような利点を有する。

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(1) 剥離紙の厚さに加えて、離間シートの厚さをICチップ保護のための間隔として使用できる。

(2) 剥離紙と離間シートの材質を異ならせれば、例えば、剥離紙は厚さの安定性を重視してPETとし、離間シートは衝撃吸収性を重視して不織布とするなどにより、より一層、ICチップの保護に優れたRFID粘着ラベルとなる。もっとも、本発明において、剥離紙と離間シートの材質は任意に選択することができ、例えば、剥離紙を紙、離間シートをPETとして、両者を厚さの安定性を重視する材料とすることができる。

(3) 第一のRFID粘着ラベルと同様に、RFID粘着ラベル全体の厚さが節約でき、プリンターへの通紙が容易化される。

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【0053】

（第一のRFID粘着ラベル1と第二のRFID粘着ラベル2の共通事項）

【0054】

隙間保持領域 23 の大きさは、任意に定めることができる。被着物に貼付けた場合に、隙間保持領域は、粘着剤がなく浮いた状態になる。RFID粘着ラベルの貼付けを確実化する観点から、その面積は小さいことが好ましい。一方、荷重に対抗する観点からは、大きな面積で荷重を分散して受け止めることが好ましい。よって、隙間保持領域はインレイの平面面積の50%以上を覆い、かつ、隙間保持領域の面積はインレイの平面面積の20%以下であることが好ましい。

【0055】

隙間保持領域の形状は、任意に定めることができる。例えば、インレイの平面形状と同じとすることができ、また、その他の形状であってもよい。図8は、隙間保持領域を六角の星型にした一例である。隙間保持領域の形状は、円形、楕円形、多角形、五角の星型、不定形などを採用することができ、意匠上好ましい形態を採用してもよい。

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【0056】

第一のRFID粘着ラベル1と第二のRFID粘着ラベル2において、インレイの形状は方形である。しかしインレイの形状は、方形に限られず、例えば円形であってもよい。

【0057】

表面基材 10 の材料は、コート紙、上質紙、クラフト紙、微塗工紙、サーマル紙、その他の紙類が使用できる。また、インク受容加工をした合成樹脂フィルムを使用することもできる。

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【0058】

第一粘着剤、第二粘着剤と第三粘着剤は、アクリル系樹脂、エチレン酢酸ビニル系樹脂、スチレン・ブタジエン系樹脂など公知の粘着剤を使用することができる。

【0059】

剥離紙30は、紙の表面に剥離処理を施したものであり、第二粘着剤21に接する一方表面に剥離処理層が露出している。剥離処理として、シリコン樹脂被覆、フッ素樹脂被覆又はアミンベースの剥離剤の被覆などが使用できる。

【0060】

インレイ30は、樹脂フィルム（例えば、厚さ38 μm のPETフィルム）上に接着剤を塗布し、アルミニウムを含むインキを用いてスクリーン印刷により渦巻き状のアンテナを形成し、さらに当該アンテナにICチップを導電的に接続・固定したものである。インレイ30は、上記基本的構成に、さらに片面及び／又は両面に、合成紙、EVA、PETシートなどが積層されていてもよい。インレイ30はその他の材料、製造方法などで製造されたものでもよい。例えば、樹脂フィルムは、ポリイミドフィルム、PBTフィルムであってもよい。アンテナの形状は、例えばダイポールアンテナであってもよい。アンテナの材質は例えば、銅であってもよい。銅箔のアンテナは、樹脂フィルムの上に銅箔層を形成し、レジストを用いてエッチングにより形成してもよく、アンテナ形状の銅箔をプレスなどにより樹脂フィルム上に貼り付けてもよい。

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【0061】

インレイ20の通信周波数は、例えば13.56MHzが使用されるが、他の周波数帯を使用してもよい。

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【0062】

インレイ表面からのICチップの突出量（突出厚さ）は、RFID粘着ラベルの用途などにより様々であるが、一例を挙げると、140 μm 、150 μm 、170 μm などがある。

【0063】

現在一般的な、インクジェット方式のプリンターの通紙許容厚さは、300 μm ～400 μm 程度である。例えば、表面基材の厚さを100 μm 、第一粘着剤の厚さを30 μm とすれば、ICチップの保護のための厚さ（剥離紙や離間シートの厚さなど）を270 μm ～170 μm にして、RFID粘着ラベルを設計することができる。

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【0064】

（第一のRFID粘着ラベル1と第二のRFID粘着ラベル2の使用方法）

【0065】

次に第一のRFID粘着ラベル1と第二のRFID粘着ラベル2の使用方を説明する。両者の使用方は同じである。

【0066】

まず、表面基材に、プリンターなどを使用して文字図形などの情報を印刷する。印刷の前、後或いは印刷と同時に、電子データをインレイに書き込む。

【0067】

次に、剥離紙の剥離領域を取り除き、第二粘着剤を露出させる。このとき、隙間保持領域は、RFID粘着ラベルに仮着した状態を保つ。そして、当該RFID粘着ラベルを、第二粘着剤により被着物に貼着する。

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【0068】

プリンターは、インクジェット方式、感熱記録方式、静電画像形成方式など公知のプリンターを使用することができる。

【0069】

（第二のRFID粘着ラベル2の製造方法）

【0070】

次に、第二のRFID粘着ラベル2を製造する製造装置6の概略図である図9を参照して、第二のRFID粘着ラベル2の製造方法を説明する。

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【0071】

第一原料粘着シート41は、表面基材の下面に第一粘着剤を塗布したものである。第一粘着剤に仮剥離紙を仮着しているので、仮剥離紙44を取り除く。表面基材の表面に、光電管マークを印刷している。当該光電管マークは第一位置表示マークである。

【0072】

インレイ42を準備し、インレイ貼付けロール51により、表面基材の下面に第一粘着剤を介してインレイを貼着し、表面基材とインレイ貼着物61を得る。このとき、第一の光電管46が、表面基材上の光電管マークを検知して、インレイ貼付けロール51への第一原料粘着シート41の送り量を調節する。

【0073】

インレイ42は、その一方表面の一部分にICチップが取り付けられている。また、インレイ42は、帯状の基材に島状にインレイ部分が形成されたインレイ連続体をそのまま第一原料粘着シートに貼着してもよく、あるいは、インレイ部分を切断して、当該切断した個々のインレイを第一原料粘着シートに貼着してもよい。

【0074】

以上により、表面基材とインレイ貼着物61が得られる。

【0075】

一方で、離間シートの上面に第三粘着剤を塗布し、前記離間シートの下面に第二粘着剤を塗布し、第二粘着剤を介して剥離紙を仮着した第二原料両面粘着シート（図示しない）を準備し、前記剥離紙を切断線により切断し、前記剥離紙を前記切断線により隙間保持領域と剥離領域に区画した、切断済第二原料両面粘着シート43を製造する。剥離紙に光電管マークを印刷している。当該光電管マークは第二位置表示マークである。

【0076】

切断済第二原料両面粘着シート43の、第三粘着剤塗布面に仮剥離紙45を仮着しているので、これを取り除く。

【0077】

第一抜き刃ロール52と第一受けロール53により、剥離紙と離間シートが重なり合った状態で、第二貫通穴と第一貫通穴を同時に空ける。第二の光電管47で剥離紙の光電管マークを読み取り、第一抜き刃ロール52への、切断済第二原料両面粘着シート43の送り量を調節する。

【0078】

これにより、穴空き切断済第二原料両面粘着シート63が得られる。

【0079】

次に、貼り合わせロール54、55により、表面基材とインレイ貼着物61と穴空き切断済第二原料両面粘着シート63を貼り合わせる。このとき、第一の光電管46の検知による第一原料粘着シート41の送り量（すなわち、表面基材とインレイ貼着物61の送り量に等しい）と、第二の光電管47の検知による切断済第二原料両面粘着シートの送り量（すなわち、穴空き切断済第二原料両面粘着シート63に等しい）が調節され、両者の貼り合わせ位置を合致させることにより、ICチップが、第一貫通穴と第二貫通穴の内部に位置付けられる。

【0080】

その後、第二抜き刃ロール56と、第二受けロール57により、表面基材の周囲が切断され、滓が滓上げロール58に巻き取られ、RFID粘着ラベル60が出来上がる。ここで、RFID粘着ラベルは、帯状の剥離紙の上に、多数のRFID粘着ラベルが島状に載置された連続体として得られる。

【0081】

以上のように、光電管マークと光電管による位置表示と位置検出および、当該検出データによる送り量の制御を行ったので、ICチップが貫通穴に過不足なく収まり、製品の歩留まりが向上する。

【0082】

位置検出手段は、光電管マークと光電管によるものに限られず、例えば、印刷マークとC C Dカメラなど、公知の手段を使用すればよい。

【実施例 1】

【0083】

以下のような寸法の第二のR F I D粘着ラベル2を製造した。

【0084】

表面基材 上質紙 厚さ100 μ m

離間シート P E Tシート 厚さ25 μ m

剥離紙 上質紙 厚さ100 μ m

R F I D粘着ラベルの全体厚さ 275 μ m

インレイのI Cチップ突出高さ150 μ m

上記のR F I D粘着ラベルを作成し、直径1.2m、長さ1.6mの新聞原紙ロール（重量約1.2トン）の外周に貼付けた。

【0085】

原紙ロールを転がして移動したのち、R F I D粘着ラベルの通信機能を試験したところ、通信機能に障害はなかった。

【図面の簡単な説明】

【0086】

【図1】第一のR F I D粘着ラベル1の平面図である。

【図2】図1のA-A'線で切断した第一のR F I D粘着ラベル1の断面図である。

【図3】第一のR F I D粘着ラベル1の底面図である。

【図4】第二のR F I D粘着ラベル2の平面図である。

【図5】図4のB-B'線で切断した第二のR F I D粘着ラベル2の断面図である。

【図6】図4のC-C'線で切断した第二のR F I D粘着ラベル2の断面図である。

【図7】第二のR F I D粘着ラベル2の底面図である

【図8】別形状の隙間保持領域の一例を示す、R F I D粘着ラベル2の底面図である。

【図9】第二のR F I D粘着ラベル2を製造する製造装置6の概略図である。

【図10】従来のマスク材を備えたR F I Dスマートラベル101の断面図である。

【符号の説明】

【0087】

1 第一のR F I D粘着ラベル

2 第二のR F I D粘着ラベル

6 第二のR F I D粘着ラベルの製造装置

11 表面基材

15 第一粘着剤

16 離間シート

19 第三粘着剤

20 第一貫通穴

21 第二粘着剤

22 剥離紙

23 隙間保持領域

24 剥離領域

25 第二貫通穴

26 切断線

【0088】

30 インレイ

31 I Cチップ

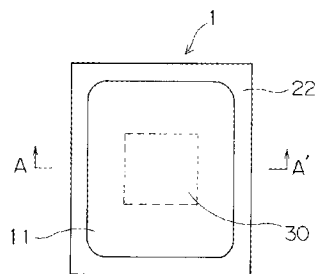
41 第一原料粘着シート

42 インレイ

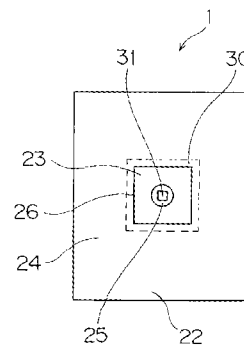
43 切断済第二原料両面粘着シート

- 4 6 第一の光電管
- 4 7 第二の光電管
- 5 2 第一抜き刃ロール
- 5 3 第一受けロール
- 5 4、5 5 貼り合わせロール
- 6 0 第二のRFID粘着ロール
- 6 1 表面基材とインレイ貼着物
- 6 3 穴空き切断済第二原料両面粘着シート
- 1 0 1 従来のマスク材を備えたRFIDスマートラベル

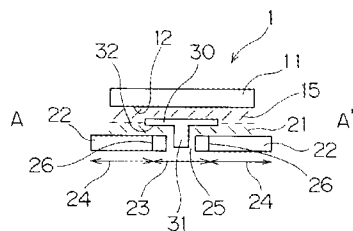
【図 1】



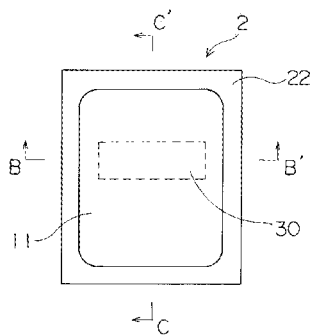
【図 3】



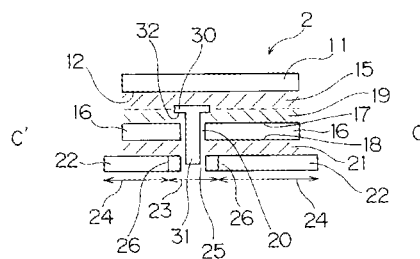
【図 2】



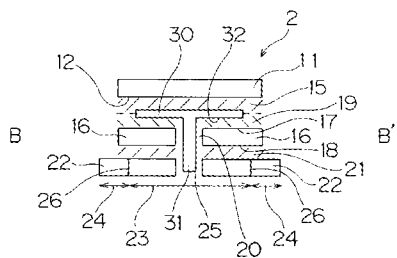
【図 4】



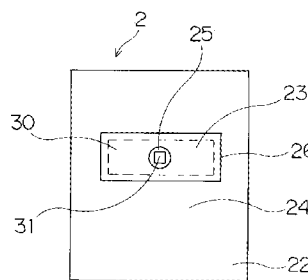
【図 6】



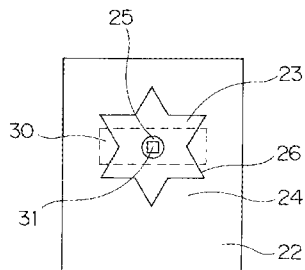
【図 5】



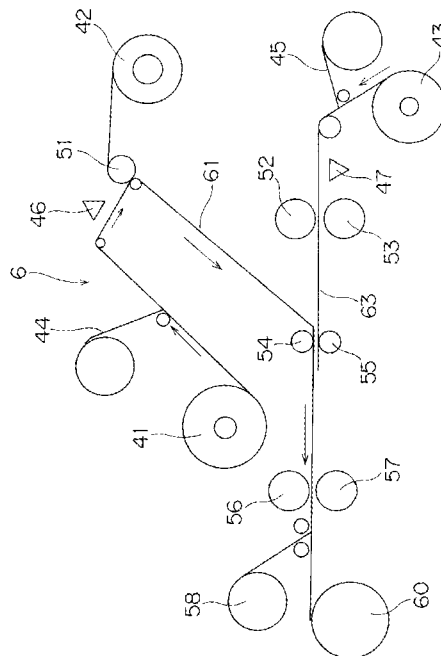
【図 7】



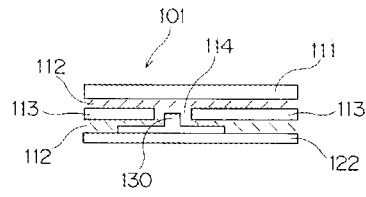
【図 8】



【図 9】



【図 10】



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< 1 of 1 Display >

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Bibliography

Close

(19) [Publication country/region] JP

(12) [Kind of official gazette] A

(11) [Publication number] 2008197887

(43) [Date of publication of application] 20080828

(54) [Title of the invention] RFID ADHESIVE LABEL

(51) [International Patent Classification]

G06K 19/077 (2006.01) G09F 3/00 (2006.01) G06K 19/07 (2006.01)

[FI]

G06K 19/00 K

G09F 3/00 M

G06K 19/00 H

(21) [Application number] 2007031924

(22) [Filing date] 20070213

(71) [Applicant]

[Name] TAC KASEI KK

(72) [Inventor]

[Full name] ITO HIROAKI

[Theme code (reference)]

5B035

[F-term (reference)]

5B035AA07

5B035BA04

5B035BA05

5B035BB09

5B035CA02

5B035CA23

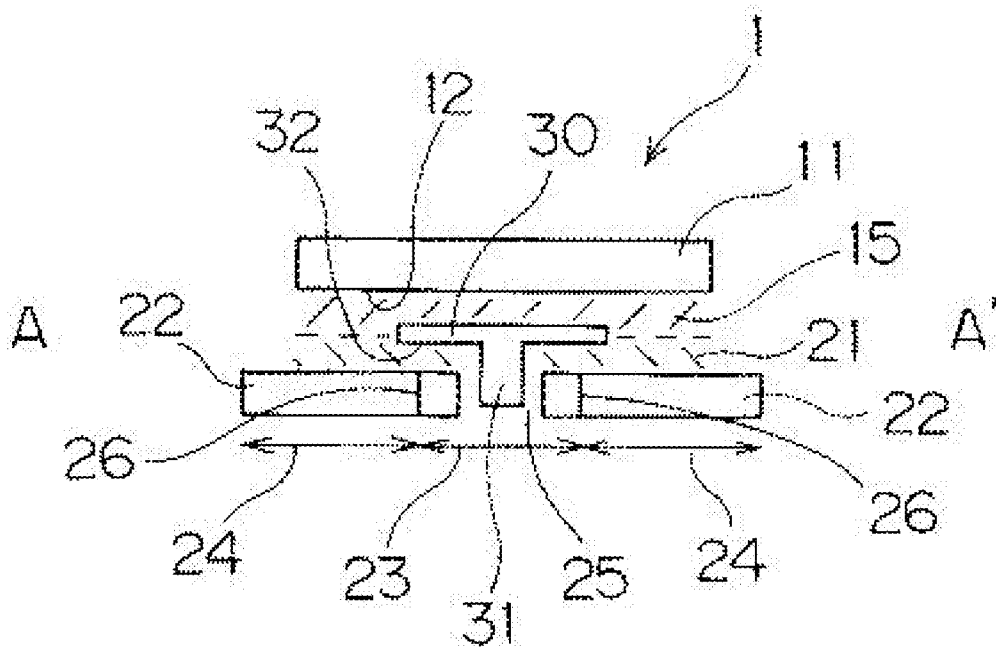
Overview

Close

(57) [Overview]

PROBLEM TO BE SOLVED: To obtain an RFID adhesive label which protects an IC chip against excessive pressure or load to a n IC chip effectively, and at the same time does not cause difficulty in passing paper to a printer.

SOLUTION: The RFID adhesive label comprises: a surface substrate 11; a first adhesive agent 15; an inlay 30 of which one side surface 32 is attached with an IC chip 31; a second adhesive agent 21; and release paper 22. The release paper 22 is partitioned to a clearance holding area 23 and an exfoliation area 24 by a cutting line 26, and has a second through hole 25 clipped by the IC chip size in the clearance holding area 23. The inlay 30 is adhered to an undersurface 12 of the surface substrate 11 through the first adhesive agent 15; the release paper 22 is temporarily adhered to the surface substrate 11 and an inlay 30 through the second adhesive agent 21, and the IC chip 31 is positioned in the second through hole 25.



Scope of Claims

Close

[Patent Claims]

[Claim 1]

In a RFID pressure sensitive adhesive label,

The device comprises a surface substrate, a first adhesive, an inlay with an IC chip attached on one surface, and a 2 adhesive and a release paper.

The release paper is partitioned into a gap holding region and a separation region by a cutting line, and has a 2 through hole

cut into the size of the IC chip in the gap holding region.

The inlay is adhered to the lower surface of the surface substrate via a first adhesive.

An RFID adhesive label is temporarily adhered to a surface substrate and an inlay deposit via a 2 adhesive, and the IC chip is positioned in the 2 through hole.

[Claim 2]

In a RFID pressure sensitive adhesive label,

This is composed of a surface substrate, a first adhesive, an inlay with an IC chip mounted on one surface, a 3 adhesive, a separation sheet having a first through-hole cut out to the size of the IC chip, and a 2 adhesive and a release paper.

The release paper is partitioned into a gap holding region and a separation region by a cutting line, and has a 2 through hole cut into the size of the IC chip in the gap holding region.

The inlay is stuck to the lower surface of the surface substrate via a first adhesive.

A surface substrate and an inlay deposit are adhered to an upper surface of the separation sheet via a 3 adhesive, and the IC chip is positioned in the first through-hole.

A release paper is temporarily attached to a lower surface of the separation sheet via a 2 adhesive, and the IC chip is positioned in the 2 through-hole.

[Claim 3]

The RFID adhesive label of claim 2, wherein the spaced sheet is made of polyethylene terephthalate.

[Claim 4]

An RFID adhesive label according to any one of claims 1 to 3 is prepared.

Information is printed on the surface substrate by a printer ;

A method for sticking an RFID adhesive label, wherein the peeling area of the release paper is removed, and an RFID adhesive label is adhered to an adherend by a 2 adhesive exposed by the removal.

[Claim 5]

A method of manufacturing an RFID adhesive label comprising the following steps :.

A step of preparing a first raw material adhesive sheet having a first adhesive agent applied to a lower surface of a surface substrate ;.

Attaching an inlay to which an IC chip is attached on one surface via a first adhesive to a lower surface of a surface substrate to obtain an inlay deposit and an inlay deposit.

A step of applying a 3 adhesive to the upper surface of the separation sheet, applying a 2 adhesive to the lower surface of the separation sheet, preparing a 2 material double-sided pressure-sensitive adhesive sheet to which the release paper is temporarily adhered via the 2 adhesive, and cutting the release paper by a cut line, and dividing the release paper into a gap holding region and a separation region by the cut line.

A step of forming a through hole having a size of the IC chip through the separation paper and the separation sheet in the gap holding area of the cut 2 raw material double-sided adhesive sheet obtained by the step of.

The step of laminating the RFID adhesive label by laminating the surface substrate obtained by the step of "U", the inlay deposit, and the perforated 2 raw material double-sided adhesive sheet obtained by the step of "" and positioning the IC chip in the through hole.

[Claim 6]

The method of manufacturing an RFID adhesive label according to claim 5, wherein a first position indication mark is printed on an upper surface of the surface substrate, a 2 position indication mark is printed on a lower surface of the release paper, a first position indication mark is detected, and a 2 position indication mark is detected, and the sticking step of the hoe is performed by matching the bonding positions of the two.

Detailed Description

Close

[Detailed description of the invention]

[Technical field]

[0001]

The present invention relates to RFID adhesive labels.

[Background of the Invention]

[0002]

Conventionally, RFID smart labels have been proposed which have a mask material so as to prevent uneven printing on the surface substrate and prevent the position of the transponder from being detected. That is, the RFID smart label 101 having a conventional mask material has a laminate of a surface substrate 111, a mask material 113 having a hole 114 formed therein, a transponder 130 having a protrusion positioned in the hole 114, and a liner 122, as shown in FIG. 10. An adhesive agent 112 is positioned on the upper and lower surfaces of the mask material 113. (For example, see Patent document 1).

[0003]

[Patent document 1] U. S. Patent Publication No. US6294998

[Disclosure of invention]

[Problem to be solved by the invention]

[0004]

After the RFID adhesive label has been manufactured, it is printed on a surface substrate, an electronic data is written, and an article is attached to an article.

[0005]

To solve the problem that a mask material must be thickened according to the thickness of an IC chip in order to prevent an unexpected load to an IC chip in an RFID adhesive label provided with a conventional mask material. As a result, when the thickness of the IC chip increases, the thickness of the entire RFID adhesive label inevitably increases, and a new problem arises in that it becomes difficult to pass paper through the printer.

[0006]

For example, when an RFID adhesive label, such as a newspaper base paper, provided with a conventional mask material is attached to an outer periphery of a roll of a paper sheet, and then the roll is moved, an excessive weight or pressure is applied to the IC chip, so that the IC chip is cracked and the RFID function is destroyed. Here, if a countermeasure to thicken the mask material is taken, the thickness of the entire RFID adhesive label becomes thick, and as a result, it becomes difficult to pass the RFID adhesive label to the printer.

[0007]

It is therefore an object of the present invention to provide an RFID adhesive label which effectively protects an IC chip from excessive pressure and load on an IC chip and does not cause difficulty in passing paper through a printer.

[0008]

Another object of the present invention is to provide a method of attaching a similar RFID adhesive label.

[0009]

It is another object of the present invention to provide a method of manufacturing an RFID adhesive label which effectively protects an IC chip without causing unexpected damage to an inlay in a manufacturing process, and which does not cause difficulty in passing through a printer.

[0010]

Other objects of the invention will become apparent from the description of the invention.

[Means for solving the problem]

[0011]

The means for solving a technical problem is described. In order to facilitate understanding, the present invention will be described with reference to the accompanying drawings, but the present invention is not limited thereto.

[0012]

An RFID adhesive label 1 according to an embodiment of the present invention comprises a surface substrate 11, a first adhesive 15, an inlay 30 having an IC chip 31 attached to one surface 32, and a release paper 22 and a 2 adhesive 21.

The separation paper 22 is partitioned into a gap holding region 23 and a separation region 24 by a cutting line 26, and the 2 through hole 25 is cut into the size of the IC chip in the gap holding region 23.

The inlay 30 is adhered to the lower surface 12 of the surface substrate via a first adhesive 15, and the release paper 22 is temporarily attached to the surface substrate and the inlay deposit via a 2 adhesive 21, and the IC chip 31 is positioned in the 2 through hole 25.

[0013]

An RFID adhesive label 2 according to another aspect of the present invention includes a surface substrate 11, a first adhesive 15, an inlay 30 having an IC chip 31 attached to one surface 32, a 3 adhesive 19, a separation sheet 22 having a first through-hole 20 cut into the size of the IC chip, and a 2 adhesive 21 and a release paper. 16The release paper 22 is partitioned into a gap holding region 23 and a separation region 24 by a cutting line 26, and has a 2 through hole 25 cut into the size of the IC chip in the gap holding region 23, and the inlay 30 is stuck to the lower surface 12 of the surface base material via a first adhesive 15. A surface substrate and an inlay deposit are adhered to an upper surface 17 of the separation sheet 16 via a 3 adhesive 19, the IC chip 31 is positioned in a first through-hole 20, a release paper 22 is temporarily attached to a lower

surface 18 of the separation sheet 16 via a 2 adhesive 21, and the IC chip 31 is positioned in a 2 through-hole 25.

[0014]

In a preferred embodiment of the present invention, the separation sheet 22 may be made of polyethylene terephthalate. A sheet of polyethylene terephthalate (hereinafter referred to as "PET") is excellent in dimensional stability against a load, and therefore is suitable for holding an IC chip in a first through-hole and protecting an IC chip from a load.

[0015]

However, in the present invention, the material of the separation sheet may be paper, synthetic paper, nonwoven fabric, synthetic resin, or the like.

[0016]

According to another aspect of the present invention, there is provided a method of attaching an RFID adhesive label, wherein an RFID adhesive label according to the present invention is prepared, information is printed on the surface base material by a printer, and then the release region of the release paper is removed, and an RFID adhesive label is adhered to an adherend by a 2 adhesive exposed by the removal.

[0017]

A method of manufacturing an RFID adhesive label 2 according to another aspect of the present invention includes the following steps.

A step of preparing a first raw material adhesive sheet having a first adhesive agent applied to a lower surface of a surface substrate ;.

Attaching an inlay to which an IC chip is attached on one surface via a first adhesive to a lower surface of a surface substrate to obtain an inlay deposit and an inlay deposit.

A step of applying a 3 adhesive to the upper surface of the separation sheet, applying a 2 adhesive to the lower surface of the separation sheet, preparing a 2 material double-sided pressure-sensitive adhesive sheet to which the release paper is temporarily adhered via the 2 adhesive, and cutting the release paper by a cut line, and dividing the release paper into a gap holding region and a separation region by the cut line.

A step of forming a through hole having a size of the IC chip through the separation paper and the separation sheet in the gap holding area of the cut 2 raw material double-sided adhesive sheet obtained by the step of.

The step of laminating the RFID adhesive label by laminating the surface substrate obtained by the step of "U", the inlay deposit, and the perforated 2 raw material double-sided adhesive sheet obtained by the step of "" and positioning the IC chip in the through hole.

[0018]

In a preferred embodiment of the invention, a first position indicator mark is printed on an upper surface of the surface substrate, and a 2 position indicator mark is printed on a lower surface of the release paper, to detect a first position indicator mark. The method of manufacturing an RFID adhesive label may be such that a 2 position indication mark is detected, and a bonding process of a hoe is performed by matching the bonding positions of the two.

[0019]

The present invention, the preferred embodiment of the present invention, and the components included therein described above can be combined as much as possible.

[Effect of the Invention]

[0020]

In the RFID adhesive label of the present invention, a 2 through hole is provided in a release paper, and an IC chip is positioned in the 2 through hole. Therefore, the maximum thickness of the RFID adhesive label does not change when the information is printed on the surface substrate and when the information is attached to the adherend. In other words, the present invention is an RFID adhesive label which can be used as an interval for protecting an IC chip as it is, can effectively protect an IC chip from an excessive pressure and load on an IC chip, and does not cause a difficulty in passing paper to a printer. Further, the present invention does not require a special separation sheet, and measures the load on the IC chip with a simple configuration.

[0021]

In an RFID adhesive label according to another aspect of the present invention, a 2 through-hole is provided in a release paper, a first through-hole is provided in a separation sheet, and an IC chip is positioned in the 2 through-hole and the first through-hole. Thus, in addition to the thickness of the release paper, the thickness of the separation sheet can be used as a thickness for IC chip protection. Further, if the materials of the separation paper and the separation sheet are made different from each other, for example, the separation paper is made into PET with emphasis on the stability of the thickness of the separation paper, and the separation sheet is made to be a nonwoven fabric with emphasis on impact absorption property, so that an RFID adhesive label superior in protection of the IC chip is obtained. At the same time, the overall thickness of the RFID

adhesive label can be saved and paper passing to the printer can be facilitated.

[0022]

In the method for sticking an RFID adhesive label according to the present invention, an RFID adhesive label is used to protect the projection height of an IC chip of an inlay by the thickness of both of a separation sheet and an interval holding region provided on a separation paper. To provide a method for sticking an RFID adhesive label which is easy to pass through a printer before sticking, and which does not break even if a large load is applied after sticking.

[0023]

In the method of manufacturing an RFID adhesive label according to the present invention, since a double-sided pressure-sensitive adhesive sheet is used as a separation sheet, there is no step of applying an unexpected impact to an inlay such as a case of applying a glue to an inlay. In addition, since through-holes are simultaneously formed in the release paper and the double-sided pressure-sensitive adhesive sheet, it is not necessary to take time and labor, and a step of aligning the 2 through hole and the first through hole is not necessary, and an accident that the IC chip is broken in the manufacturing process is reduced. Therefore, the present invention provides a method of manufacturing an RFID adhesive label which protects an IC chip from a load by a simple and inexpensive process, and at the same time, can easily pass through a printer.

[Best mode for carrying out the invention]

[0024]

Hereinafter, an RFID adhesive label, a method of attaching an RFID adhesive label, and a method of manufacturing an RFID adhesive label according to an embodiment of the present invention will be further described with reference to the drawings. The dimensions, materials, shapes, and relative positions of the members and the parts described in the embodiments of the present invention are not intended to limit the scope of the present invention thereto unless otherwise specified, and are merely illustrative examples. In addition, in order to facilitate understanding of the characteristics of the present invention, the drawings according to the present embodiment are prepared by ignoring the dimensional ratio.

[0025]

(First RFID adhesive label 1).

[0026]

First, a configuration of the first RFID adhesive label 1 will be described.

[0027]

FIG. 1 is a plan view of the RFID adhesive label 1, FIG. 2 is a cross-sectional view of the RFID adhesive label 1 taken along line A-A' of FIG. 1, and FIG. 3 is a bottom view of the RFID adhesive label 1.

[0028]

In the first RFID adhesive label 1, a surface substrate 11, a first adhesive 15, an inlay 30, a 2 adhesive 21, and a release paper 22 are laminated in this order from the front side. An inlay 30 is a circuit unit of an RFID to which an IC chip 31 connected to an antenna and an antenna is fixed on a film such as polyethylene terephthalate (PET). An IC chip is mounted on a portion of one side of a film on which an antenna is formed, in a form protruding from one side of the film. According to the present invention, one surface 32 on which an IC chip 31 is mounted has an RFID adhesive.

It is positioned on the release paper side of the label (below the label).

[0029]

The separation paper 22 is partitioned into a gap holding region 23 and a separation region 24 by a cutting line 26. In FIG. 2, the gap holding region is indicated by a line segment 23 and the separation region is indicated by a line segment 24. The cut line 26 is a so-called cut line, and the release paper 22 retains the sheet form, since the release paper 22 is completely cut by the cut line 26, but both the gap holding region 23 and the peel region 24 are bonded to the surface substrate 11 directly or indirectly through the inlay 30.

[0030]

The gap holding region 23 has a 2 through hole 25. The 2 through hole 25 is a portion in which the IC chip 31 is positioned. Therefore, a lower limit of the size of the 2 through hole 25 is a size in which the IC chip 30 is circumscribed. For example, when the 2 through hole is circular, a margin dimension (e.g., a diameter margin dimension (e.g., 0.5)) necessary for machining is added to the diameter of the circumscribed circle of the IC chip 31. The upper limit of the size of the 2 through hole is generally not particularly defined. However, it is below a circle of the diameter which usually added 5 mm to the lower limit of the aforementioned diameter in view of the IC chip protection from load, preferably below the circle of the diameter which added 3 mm. In addition to a circular shape, the 2 through hole may be, for example, a rectangular shape, and a rectangular size may be determined in accordance with the circular shape.

[0031]

The inlay 30 is adhered to the lower surface 12 of the surface substrate 11 via a first adhesive 15. A release paper 22 is temporarily attached to the surface substrate and the inlay deposit via a 2 adhesive 21, and the IC chip 31 is positioned in the 2

through hole 25. Therefore, the protruding height of the IC chip 31 is hidden by the thickness of the release paper 22.

[0032]

Typically, the planar size of inlay 30 is the same as or smaller than the planar size of surface substrate 11 or 11. In the portion where the inlay is present, the laminated state becomes a surface substrate 11, a first adhesive 15, an inlay 30, a 2 adhesive 21, and a release paper 22. In the portion where the inlay is not present, the laminated state becomes the surface substrate 11, the first adhesive 15, the 2 adhesive 21, and the release paper 22. In other words, the first adhesive 15 and the 2 adhesive 21 are in direct contact with each other.

[0033]

Thus, the first RFID adhesive label 1 has the following advantages.

(1) The thickness of the release paper is a thickness for protecting the IC chip from the load as it is. In an RFID adhesive label provided with a conventional mask material, a mask material is thickened to protect an IC chip, and as a whole, a printer is passed through a printer as a whole including a thickness of a temporarily adhered release paper. Here, the release paper was discarded before being stuck to the adherend. In contrast, in the first RFID adhesive label according to the present invention, an overall thickness of an IC chip can be protected, and a printer can be easily passed through a printer.

(2) Since the gap for protecting the IC chip can be maintained without the mask material, the configuration is simplified and the material is reduced compared with an RFID adhesive label provided with a conventional mask material. Therefore, the manufacturing process is simplified and the manufacturing cost is reduced.

[0034]

(2 RFID adhesive label 2)

[0035]

Next, a configuration of the 2 RFID adhesive label 2 according to another embodiment will be described.

[0036]

FIG. 4 is a plan view of the RFID adhesive label 2, FIG. 5 is a cross-sectional view of the RFID adhesive label 1 taken along line B-B ' of FIG. 4, FIG. 6 is a cross-sectional view of the RFID adhesive label 2 taken along line C-C ' of FIG. 4, and FIG. 7 is a bottom view of the RFID adhesive label 2. In the 2 RFID adhesive label 2, components and parts similar to those of the first RFID adhesive label 1 are denoted by the same reference numerals.

Hereinafter, different points from the first RFID adhesive label will be mainly described.

[0037]

In the 2 RFID adhesive label 2, a surface substrate 11, a first adhesive 15, an inlay 30, a 3 adhesive 19, a separation sheet 16, a 2 adhesive 21, and a release paper 22 are laminated in this order.

[0038]

More specifically, in general, a separation sheet 16 is added to the first RFID adhesive label.

[0039]

The separation sheet 16 has a first through-hole 20 cut out of the size of the IC chip 31. The first through hole 20 is a portion in which the IC chip 31 is positioned. The size, shape, and the like of the first through hole are the same as those of the 2 through hole of the first RFID adhesive label.

[0040]

As the material of the separation sheet 16, polyethylene terephthalate can be suitably used. This is because, even if a load is applied, the thickness is hardly changed. However, it may be a paper, a synthetic paper, a nonwoven fabric, or the like. Nonwoven fabrics can be used for spacing and / or shock absorbing purposes.

[0041]

The separation sheet 16 may be formed by applying a double-sided pressure-sensitive adhesive sheet on one side of which a 3 pressure-sensitive adhesive 19 is applied to one side of a sheet material and a 2 pressure-sensitive adhesive on the other side of the sheet material. In this way, for example, it is not necessary to apply the 3 adhesive 19 to the inlay, and it is possible to reduce the chance of an unexpected impact on the inlay.

[0042]

In addition, in the separation sheet 16 and the separation paper 22, a sheet in which a release paper is temporarily adhered to the double-sided pressure-sensitive adhesive sheet is prepared, and a process in which the 2 through-hole and the first through-hole are simultaneously bored simultaneously may be performed. Thereafter, the surface substrate and the inlay deposit are adhered. In this way, it is possible to save time and effort for aligning the positions of the first through hole and the 2 through hole. In addition, it is possible to prevent the IC chip from being damaged and damage to the IC chip.

[0043]

Hereinafter, components similar to those of the first RFID adhesive label will be briefly described.

[0044]

The separation paper 22 is partitioned into a gap holding region 23 and a separation region 24 by a cutting line 26.

[0045]

In FIGS. 5 and 6, the gap holding region is indicated by a line segment 23 and the stripping region is indicated by a line segment 24. The cutting line 26 is a so-called cutting line, and the separation paper 22 is completely cut by the cutting line 26, but both of the gap holding region 23 and the separation region 24 are adhered to the separation sheet 16, so that the separation paper 22 retains the sheet form.

[0046]

The gap holding region 23 has a 2 through hole 25 cut into the size of the IC chip 31. The 2 through hole 25 is a portion in which the IC chip 31 is positioned. The lower limit and the upper limit of the size of the 2 through hole and the preferred range are the same as the lower limit and the upper limit of the size of the 2 through hole 20 in the first RFID adhesive label, and the preferred range.

[0047]

An inlay 30 is stuck to a lower surface 12 of a surface substrate 11 via a first adhesive 15. The inlay 30 positions one surface 32 on which the IC chip 31 is attached on the side of the release paper 22 side of the RFID adhesive label.

[0048]

A surface substrate and an inlay deposit are adhered to an upper surface 17 of the separation sheet 16 by a 3 adhesive 19. The IC chip 31 is positioned in the first through hole 20. Therefore, an IC chip

A portion of the projection height is hidden by the thickness of the separation sheet 16.

[0049]

A separation sheet 16 is temporarily adhered to a release paper through a 2 adhesive 21 on a lower surface 18 of the separation sheet 2. The IC chip 31 is positioned in the 2 through hole 25. A portion of the projection height of the IC chip, I. e., a height portion which is not hidden by the thickness of the separation sheet 16, is hidden by the thickness of the separation paper.

[0050]

However, the thickness of the separation sheet 16 may be increased more than the projection height of the IC chip. In this case, the thickness of the release paper acts as a preliminary thickness to protect the IC chip from overloads. Alternatively, the thickness of the release paper (or separation sheet) may be used for the primary purpose of shock absorption.

[0051]

Typically, the planar size of inlay 30 is the same as or smaller than the planar size of surface substrate 11 or 11. In a portion where an inlay is present, a laminated state of a cross section becomes a surface substrate 11, a first adhesive 15, an inlay 30, a 3 adhesive 19, a separation sheet 16, a 2 adhesive 21, and a release paper 22. In the portion where the inlay is not present, the laminated state of the cross section becomes the surface substrate 11, the first adhesive 15, the 3 adhesive 19, the separation sheet 16, the 2 adhesive 21, and the release paper 22. In other words, the first adhesive 15 and the 3 adhesive 19 are in direct contact with each other.

[0052]

Thus, the 2 RFID adhesive label 2 has the following advantages.

(1) In addition to the thickness of the release paper, the thickness of the separation sheet can be used as an interval for IC chip protection.

(2) If the materials of the release paper and the separation sheet are different from each other, for example, the separation paper is made into a PET with emphasis on the stability of the thickness, and the separation sheet is made into a nonwoven fabric with emphasis on impact absorption property, so that an RFID adhesive label superior in protection of the IC chip is obtained. But -- in the present invention -- a releasing paper and alienation -- the material of a sheet can be chosen arbitrarily -- for example, a releasing paper -- paper and alienation -- both can be used as the material which thinks the stability of thickness as important by setting a sheet to PET.

(3) As with the first RFID adhesive label, the overall thickness of the RFID adhesive label can be saved and paper passing to the printer can be facilitated.

[0053]

(Common item of first RFID adhesive label 1 and 2 RFID adhesive label 2)

[0054]

The size of the gap holding region 23 may be arbitrarily determined. When applied to an adherend, the gap holding region is in a floating state without an adhesive. From the viewpoint of ensuring the attachment of the RFID adhesive label, it is preferable that the area thereof is small. On the other hand, from the viewpoint of resisting the load, it is preferable to disperse and receive the load in a large area. Therefore, it is preferable that the gap holding region covers 50% or more of the planar area of the inlay, and that the area of the gap holding region is 200% or less of the planar area of the inlay.

[0055]

The shape of the gap holding region may be arbitrarily determined. For example, it may be the same as the planar shape of the inlay and may be of other shapes. FIG. 8 shows an example in which the gap holding region is formed into a 6 corner star shape. As the shape of the gap holding region, a circular shape, an oval shape, a polygonal shape, a star shape of 5 corner s, an irregular shape, or the like may be adopted, and a preferred form of design may be adopted.

[0056]

In the first RFID adhesive label 1 and the 2 RFID adhesive label 2, the shape of the inlay is rectangular. However, the shape of the inlay is not limited to a rectangular shape, and may be, for example, a circular shape.

[0057]

As the material of the surface substrate 10, coated paper, high-quality paper, kraft paper, fine coated paper, thermal paper, or other paper can be used. It is also possible to use a synthetic resin film subjected to an ink receiving process.

[0058]

As the first pressure-sensitive adhesive, the 2 pressure-sensitive adhesive and the 3 pressure-sensitive adhesive, a known pressure-sensitive adhesive such as an acrylic resin, an ethylene-vinyl acetate resin, and a styrene / butadiene resin can be used.

[0059]

The release paper 30 is obtained by subjecting a surface of a paper to a separation treatment, and a separation treatment layer is exposed on one surface in contact with the 2 adhesive 21. As the peeling treatment, a silicone resin coating, a fluororesin coating, a coating of an amine-based peeling agent, or the like can be used.

[0060]

In the inlay 30, an adhesive is applied on a resin film (e.g., a PET film having a thickness of 38 μ m), a spiral antenna is formed by screen printing using an ink containing aluminum, and an IC chip is electrically connected and fixed to the antenna. In the inlay 30, a synthetic paper, an EVA, a PET sheet, and the like may be laminated on one side and / or on both sides of the basic structure. The inlay 30 may be made of other materials, manufacturing methods, and the like. For example, the resin film may be a polyimide film or a PBT film. For example, the antenna may be a dipole antenna. For example, the antenna may be made of copper. The antenna of the copper foil may be formed by forming a copper foil layer on a resin film and by etching using a resist, or a copper foil having an antenna shape may be adhered onto a resin film by a press or the like.

[0061]

The communication frequency of the inlay 20 is, for example, 13.56 MHz, but other frequency bands may be used.

[0062]

The amount of protrusion (protrusion thickness) of the IC chip from the inlay surface varies depending on the application of the RFID adhesive label, and examples thereof include a 140 μ m, 150 μ m, 170 μ m and the like.

[0063]

The allowable thickness of an inkjet printer of an ink-jet type is about 300 μ m-400 μ m. For example, when the thickness of the surface substrate is 100 μ m and the thickness of the first adhesive is 30 μ m, the RFID adhesive label can be designed using the thickness (thickness of the release paper or the separation sheet) for protecting the IC chip as a 270 μ m-170 μ m.

[0064]

(A method of using a first RFID adhesive label 1 and a 2 RFID adhesive label 2.)

[0065]

Next, a method of using the first RFID adhesive label 1 and the 2 RFID adhesive label 2 will be described. The method of use of both is the same.

[0066]

First, information such as character graphics is printed on a surface substrate using a printer or the like. Before, after, or simultaneously with printing, electronic data is written into the inlay.

[0067]

Next, the release region of the release paper is removed to expose the 2 adhesive. At this time, the gap holding region remains temporarily adhered to the RFID adhesive label. Then, the RFID adhesive label is adhered to an adherend by a 2 adhesive.

[0068]

As the printer, a known printer such as an ink jet system, a thermal recording system, an electrostatic image forming system, or the like can be used.

[0069]

(A method of manufacturing a 2 RFID adhesive label 2).

[0070]

Next, a method of manufacturing the 2 RFID adhesive label 2 will be described with reference to FIG. 9 which is a schematic diagram of the manufacturing apparatus 6 for manufacturing the 2 RFID adhesive label 2.

[0071]

The first raw material adhesive sheet 41 is obtained by coating a first adhesive agent on the lower surface of a surface base material. Temporary release paper is temporarily adhered to the first adhesive, so that temporary release paper 44 is removed. A photoelectric tube mark is printed on the surface of the surface substrate. The photo-tube mark is a first position-indicating mark.

[0072]

An inlay 42 is prepared and an inlay is stuck to the lower surface of a surface substrate via an inlay pasting roll 51 via a first adhesive to obtain a surface substrate and an inlay deposit 61. At this time, the first photoelectric tube 46 detects the photoelectric tube mark on the surface substrate, and adjusts the feed amount of the first raw material adhesive sheet 41 to the inlay application roll 51.

[0073]

An IC chip is attached to a portion of one surface of the inlay 42. In addition, in the inlay 42, an inlay continuous body in which an inlay portion is formed in an island shape on a band-shaped base material may be directly adhered to the first raw material adhesive sheet, or the cut individual inlay may be adhered to the first raw material adhesive sheet by cutting the inlay portion.

[0074]

Thus, an inlay deposit 61 is obtained.

[0075]

On the other hand, a 3 adhesive is applied to the upper surface of the separation sheet, and a 2 adhesive is applied to the lower surface of the separation sheet. A 2 raw material double-sided pressure-sensitive adhesive sheet (not shown) to which a release paper is temporarily adhered via a 2 adhesive is prepared, the release paper is cut by a cut line, and the cut 2 raw material double-sided adhesive sheet 43 in which the release paper is partitioned into a gap holding region and a separation region by the cut line is manufactured. A photoelectric tube mark is printed on a release paper. The photoelectric tube mark is a 2 position indicator mark.

[0076]

Since temporary release paper 45 is temporarily adhered on the 3 adhesive application surface of the cut 2 raw material double-sided adhesive sheet 43, it is removed.

[0077]

The first omission blade roll 52 and the first receptacle roll 53 -- a releasing paper and alienation -- after sheets have overlapped, the second through hole and the first through hole are vacated simultaneously. A photoelectric tube mark of a release paper is read by a 2 photoelectric tube 47, and a feed amount of a cut 2 raw material double-sided adhesive sheet 43 to a first punching blade roll 52 is adjusted.

[0078]

Thus, the 2 raw material double-coated pressure-sensitive adhesive sheet 63 is obtained.

[0079]

Next, the surface base material, the inlay deposit 61, and the perforated cut 2 raw material double-sided adhesive sheet 63 are bonded together by the bonding rolls 54 and 55. At this time, the feed amount of the first raw material adhesive sheet 41 (that is, equal to the feed amount of the surface base material and the inlay deposit 61) by the detection of the first photoelectric tube 46 is obtained. By adjusting the feed amount of the cut 2 raw material double-sided adhesive sheet by the detection of the 2 photoelectric tube 47 (that is, equal to the perforated cut 2 raw material double-sided adhesive sheet 63), the IC chip is positioned inside the first through hole and the 2 through hole by matching the bonding positions of both.

[0080]

Thereafter, the periphery of the surface substrate is cut by the 2 cutting blade roll 56 and the 2 receiving roll 57, and the dregs are taken up by the dreg-up roll 58, thereby completing the RFID adhesive label 60. Here, the RFID adhesive label is obtained as a continuous body in which a large number of RFID adhesive labels are placed in an island shape on a strip of release paper.

[0081]

As described above, since the position display and the position detection by the photoelectric tube mark and the photoelectric tube and the control of the feed amount by the detection data are performed, the IC chip fits in the through hole too little and too much, and the yield of the product is improved.

[0082]

The position detection means is not limited to the photoelectric tube mark and the photoelectric tube, and a known means such as a print mark and a CCD camera may be used.

[Example 1]

[0083]

A 2 RFID adhesive label 2 of the following dimensions was prepared.

[0084]

Surface substrate wood-free thickness 100 μ m

Separation sheet PET sheet thickness 25 μ m

Peel paper quality 100 μ m thick

Total thickness of RFID adhesive label 275 μ m

IC chip projecting height 150 μ m of inlay

An RFID adhesive label as described above was prepared and attached to the outer periphery of a newspaper roll (about 1.2 tons in weight) having a diameter of 1.2 m and a length of 1.6 m.

[0085]

When the communication function of the RFID adhesive label was tested after the roll of the original roll, there was no trouble in the communication function.

[Brief Description of the Drawings]

[0086]

[Fig. 1]FIG. 3 is a plan view of a first RFID adhesive label 1 ;.

[Fig. 2]FIG. 4 is a cross-sectional view of the first RFID adhesive label 1 taken along line A-A ' of FIG. 1 ;.

[Fig. 3]FIG. 4 is a bottom view of the first RFID adhesive label 1 ;.

[Fig. 4]FIG. 2 is a plan view of a first RFID adhesive label 2 ;.

[Fig. 5]FIG. 4 is a cross-sectional view of the 2 RFID adhesive label 2 taken along line B-B ' of FIG. 4 ;.

[Fig. 6]FIG. 4 is a cross-sectional view of the 2 RFID adhesive label 2 taken along line C-C ' of FIG. 4 ;.

[Fig. 7]FIG. 2 is a bottom view of a first RFID adhesive label 2 ;

[Fig. 8]FIG. 4 is a bottom view of an RFID adhesive label 2 showing an example of a gap holding region of another shape ;.

[Fig. 9]FIG. 2 is a schematic diagram of a manufacturing apparatus 6 for manufacturing a first RFID adhesive label 2 ;.

[Fig. 10]FIG. 1 is a cross-sectional view of an RFID smart label 101 with a conventional mask material ;.

[Explanation of letters or numerals]

[0087]

1 first RFID adhesive label

2 2 RFID adhesive label

Apparatus for producing a 6 RFID adhesive label 2

11 surface substrate

15 first adhesive

16 Alienation -- Sheet

19 3 adhesive agent

20 first through hole

21 2 adhesive agent

22 Releasing Paper

23 Gap Holding Area

24 Separating Areas

25 2 through hole

26 Cutting Plane Line

[0088]

30 INLAYS

31 ICchip

41 first raw material adhesive sheet

42 INLAYS

43 cut 2 raw material double-sided adhesive sheet

46 first photoelectric tube

47 2 photoelectric tube

52 first punching blade roll

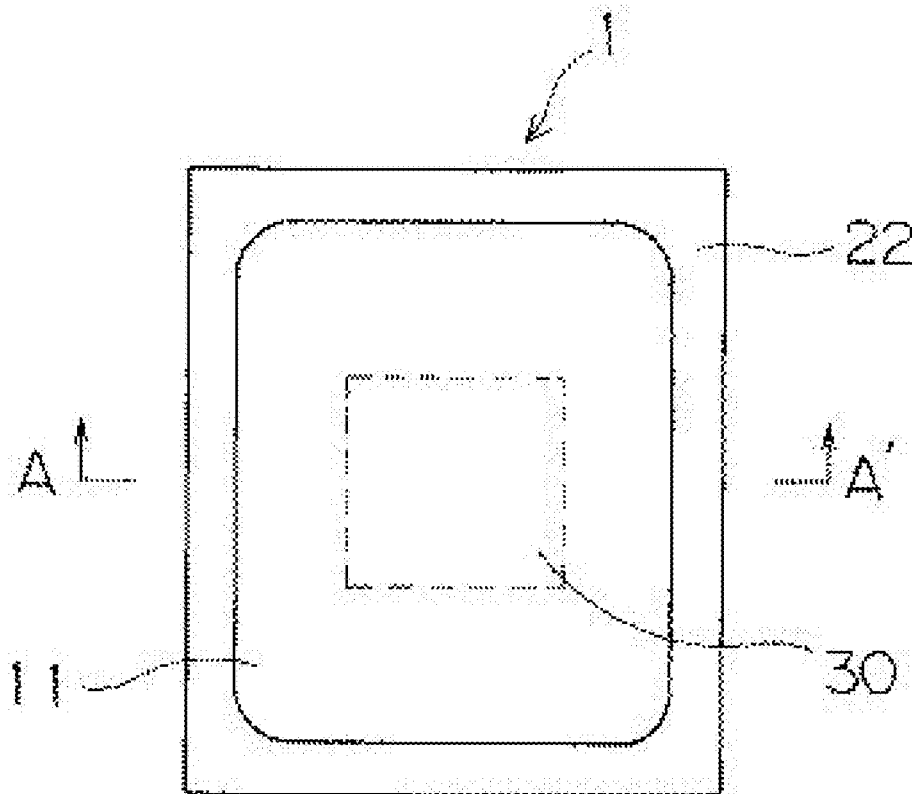
53 first receiving roll

54,55 lamination roll
60 2 RFID adhesive roll
61 surface substrate and inlay deposit
63 hole cut 2 raw material double-sided adhesive sheet
RFID smart label with 101 conventional mask material

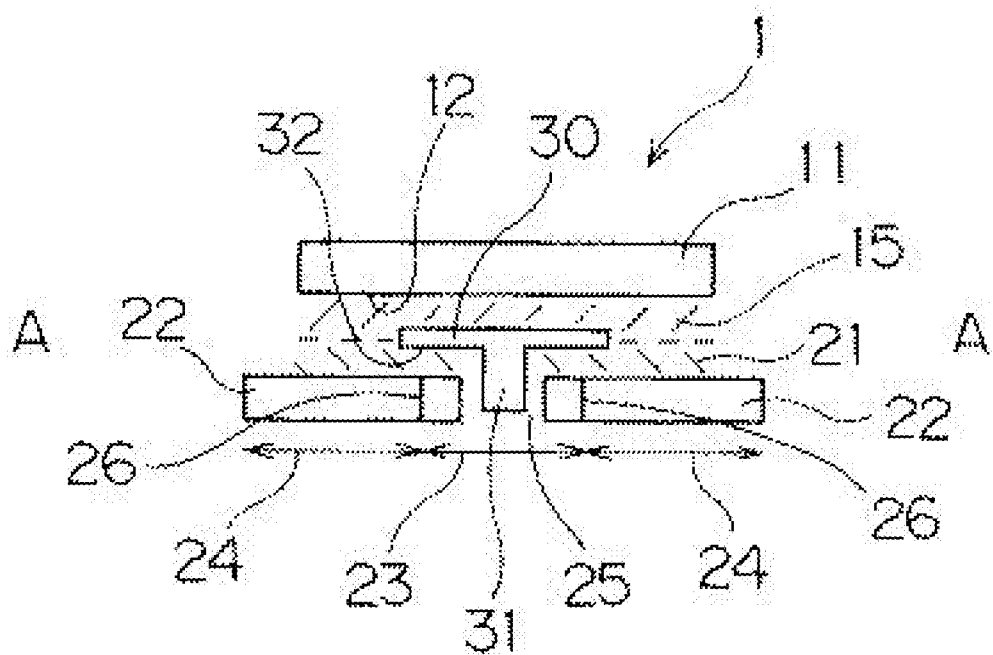
Drawings

Close

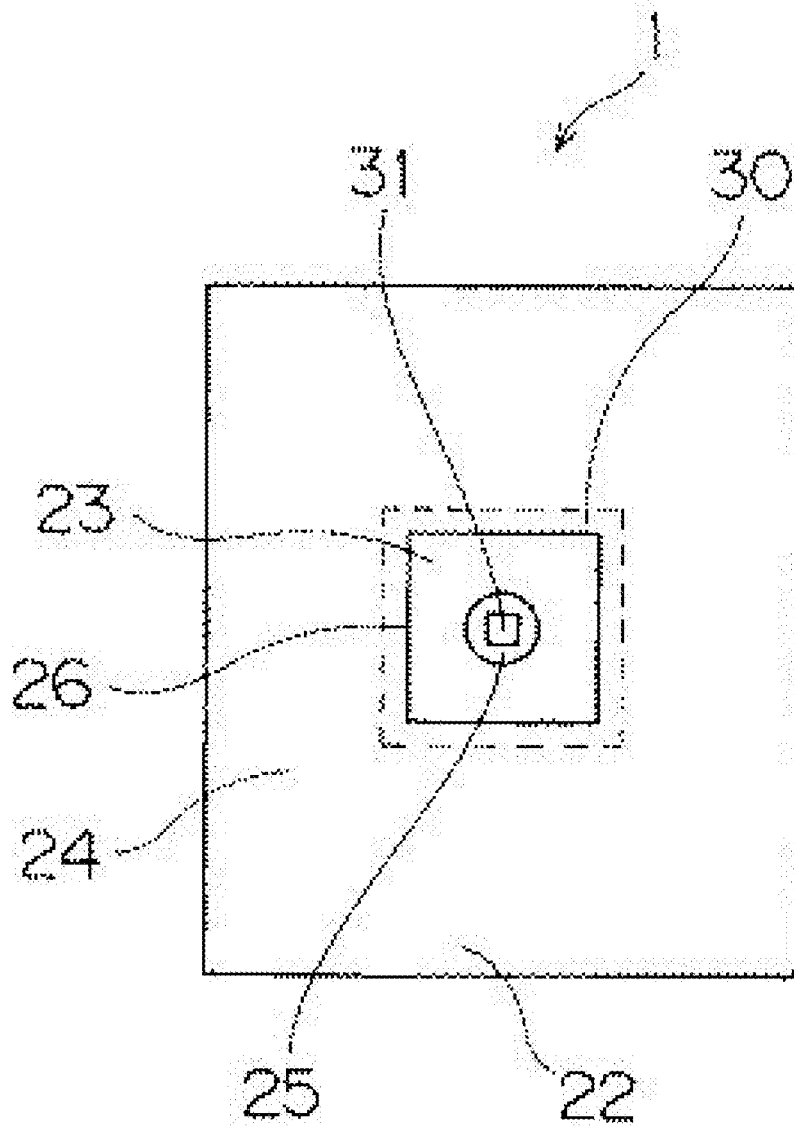
[FIG.1]



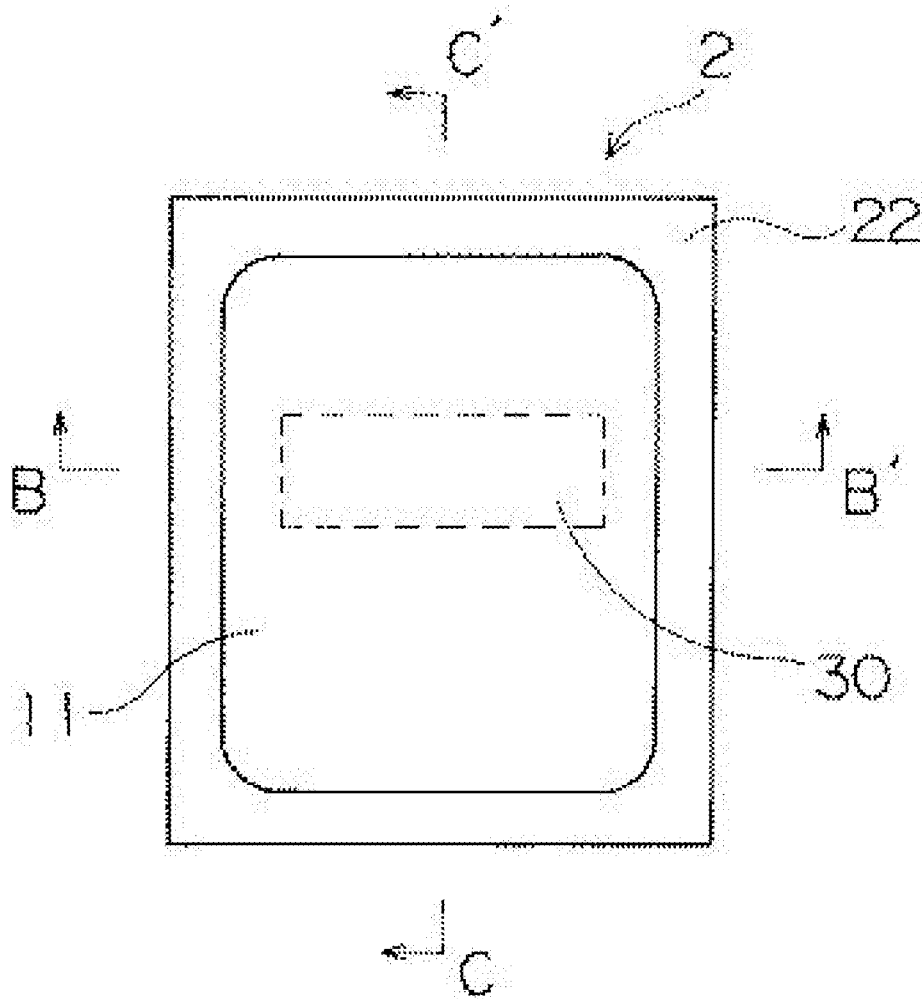
[FIG.2]



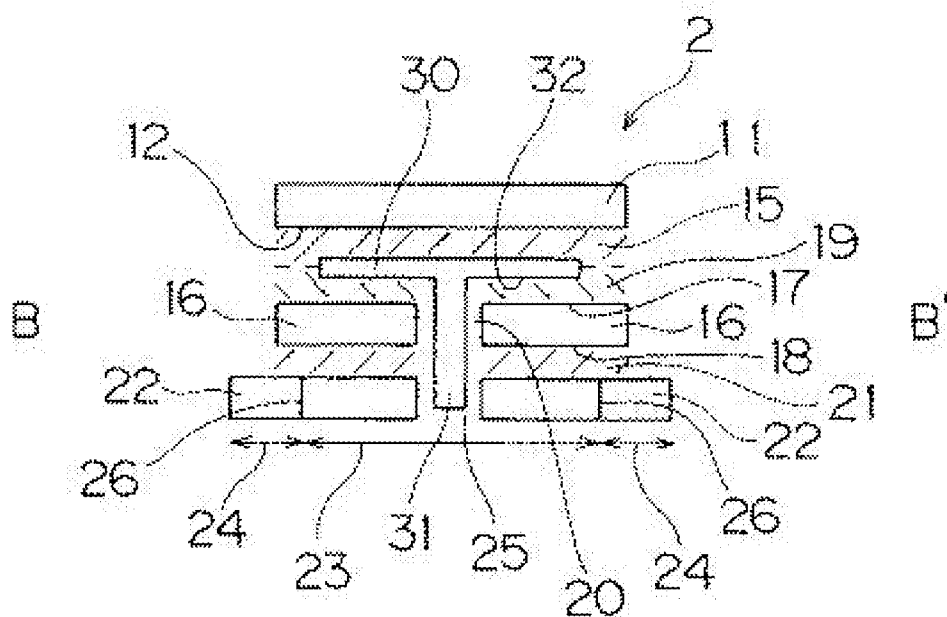
[FIG.3]



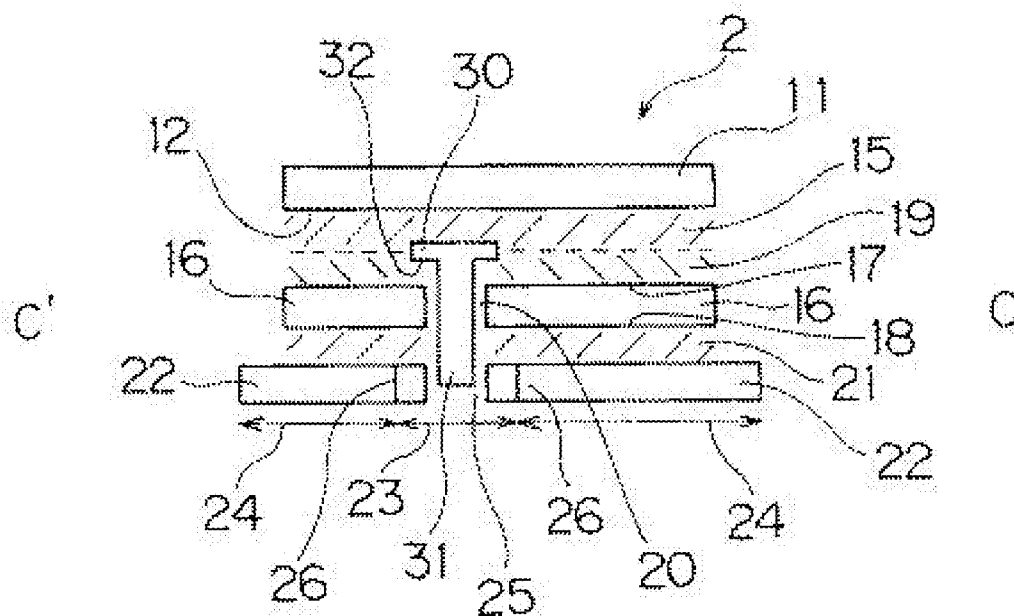
[FIG.4]



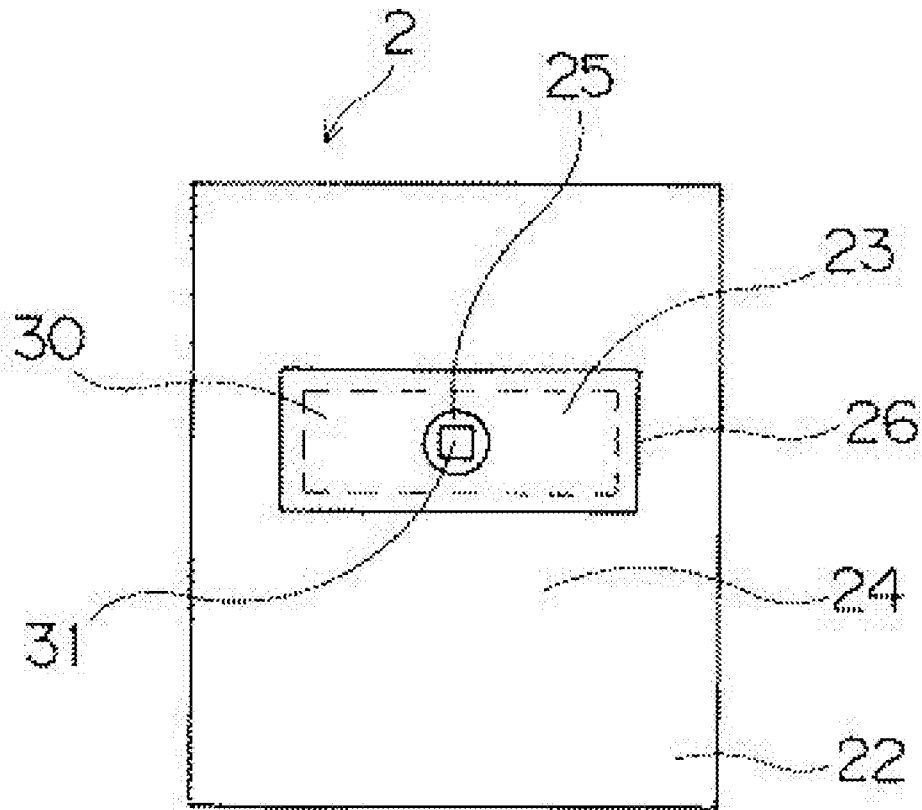
[FIG.5]



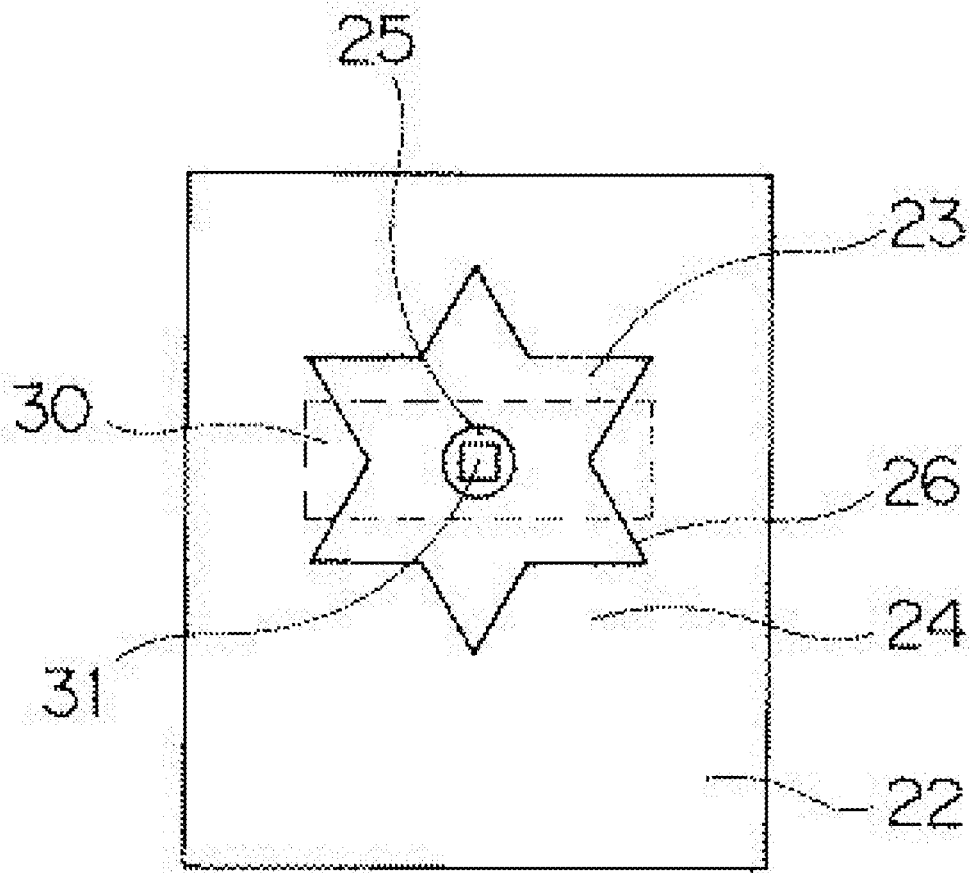
[FIG. 6]



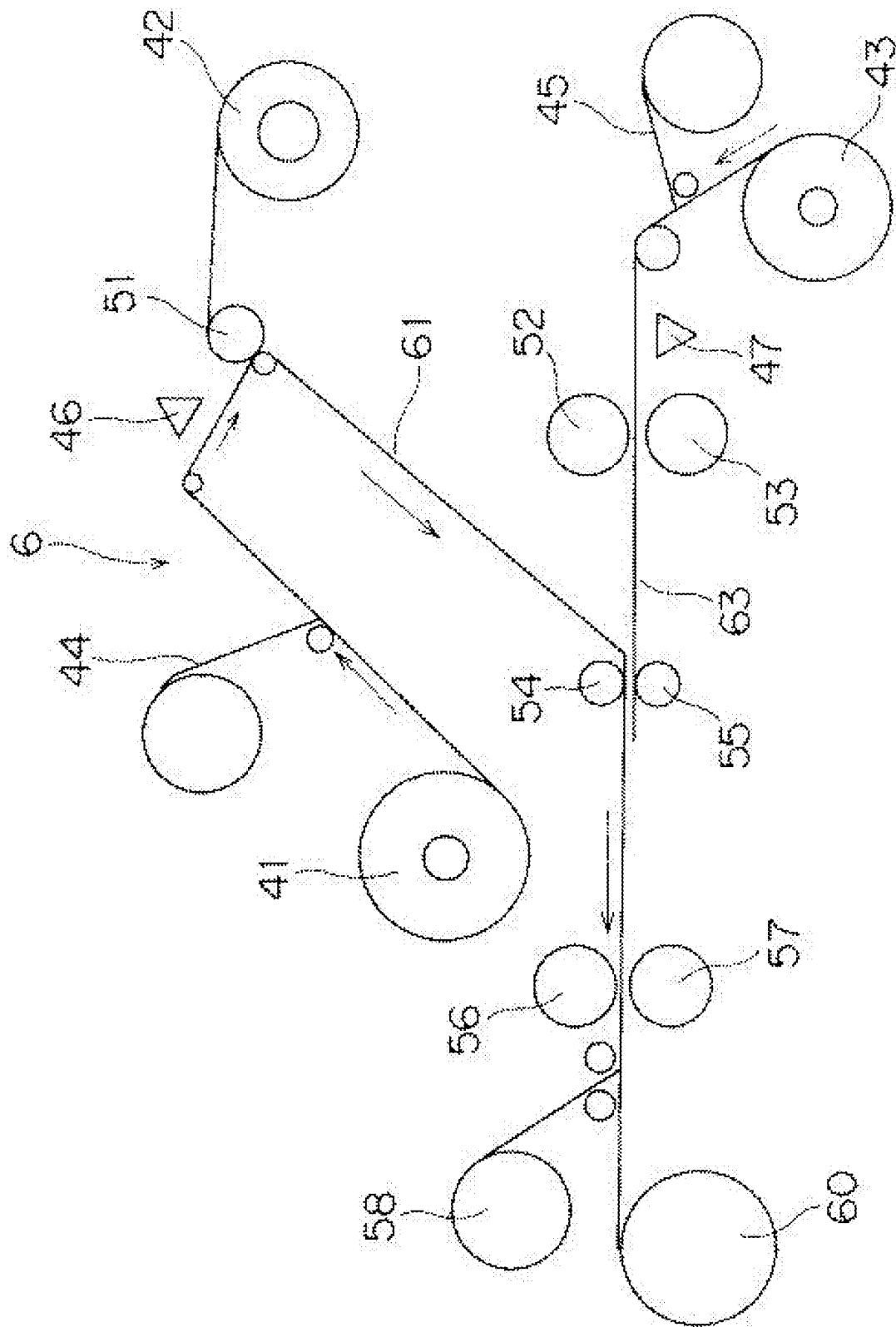
[FIG. 7]



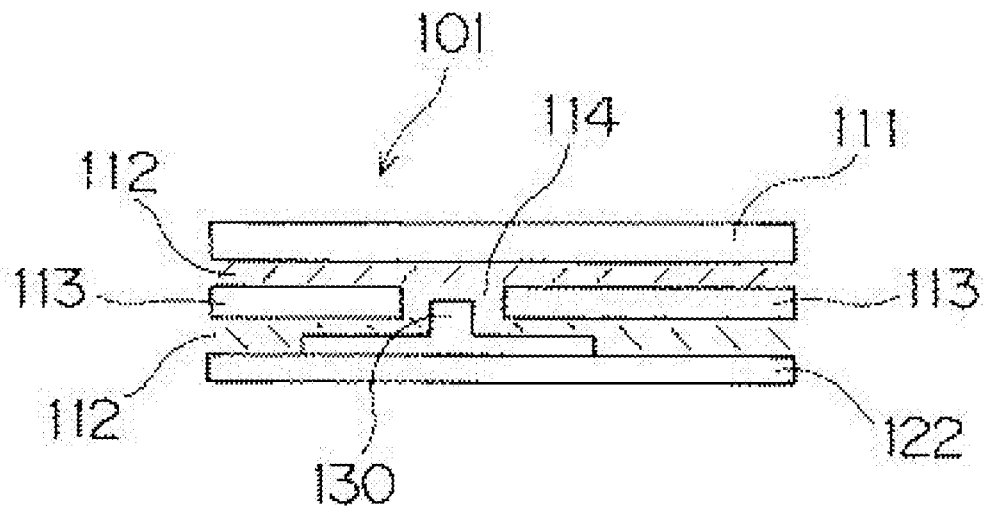
[FIG. 8]



[FIG. 9]



[FIG. 10]



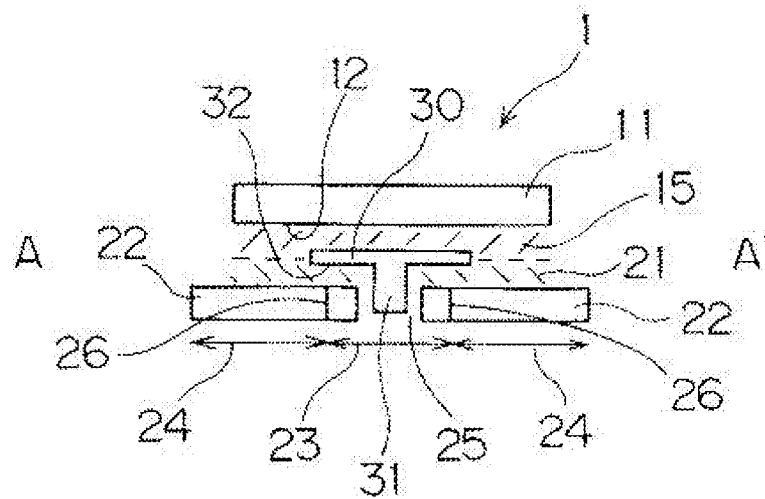
Drawings

Close

Representative drawing

1 2 3 4 5 6 7 8 9

Enlarge and Rotate



Representative drawing

< 1 of 1 Display >



Espacenet

Bibliographic data: JPH05338032 (A) — 1993-12-21

Pneumatic tire having a decorative applique and a method for applying a decorative applique to a tire

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Classification: - international: B29C65/48; B29D30/72; B60C13/04; B29K21/00; B29L30/00; (IPC1-7): B29C65/48; B29K21/00; B29L30/00; B60C13/04
 - cooperative: B29C65/483 (EP); B29C65/5057 (EP); B29C66/1122 (EP); B29C66/3452 (EP); B29C66/5326 (EP); B29C66/7234 (EP); B29C66/73756 (EP); B29D30/72 (EP); B60C13/04 (EP); B29C65/8223 (EP); B29C66/71 (EP); B29D2030/728 (EP); B29L2030/00 (EP); Y10S152/12 (EP) more

Application number: JP19930040681 19930205

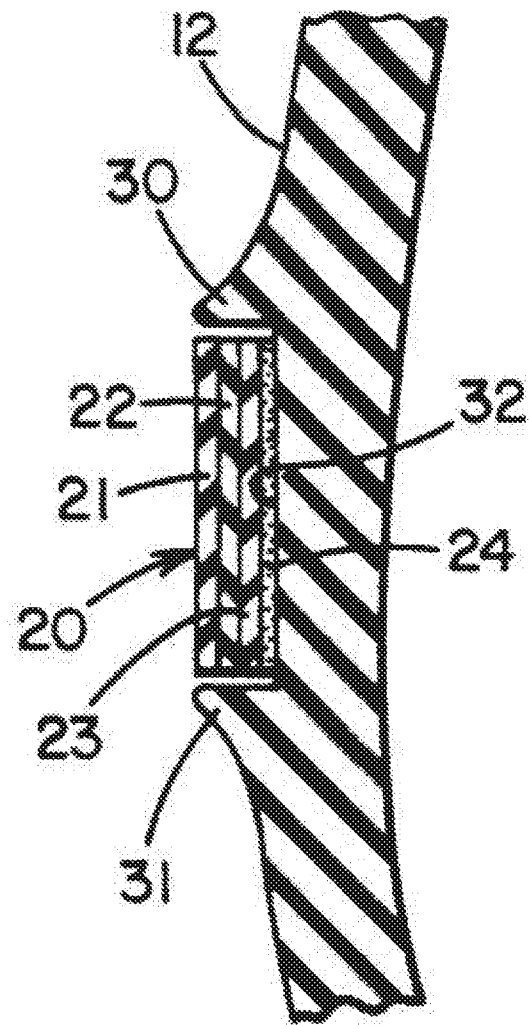
Priority number(s): US19920832455 19920207

Also published as: CA2088896 (A1) JP3240208 (B2) US5300164 (A)

Abstract of JPH05338032 (A)

PURPOSE: To reduce the cost and time for manufacturing of a tire provided with a decorative applique and obtain uniformity, by a method wherein the decorative applique, which has completed vulcanization beforehand, and an adhesive layer on an outer side wall of a tire are provided, the adhesive layer is put between the applique and side wall and both of them are stuck to each other. **CONSTITUTION:** An applique 20 possesses observable layer 21 and is made into an ordinary white side wall material. Although the observable layer 21 can be fitted directly to a tire, when the same is fitted to a barrier layer 22, a discoloration by a component within the tire such

as an anti-oxidant can be prevented. Then a harmonizing layer 23 is either fitted directly to the observable layer 21 or fitted to a barrier layer 22 and the side wall 12 of the tire 10. Then the applique 20 is vulcanized beforehand before the same is fitted to the tire 10 which has completed vulcanization. Vulcanization is performed by an ordinary method such as heating and/or chemical vulcanization or irradiation of high energy and held on the tire 10 by an adhesive.



(19)日本国特許庁(JP)

(12) 公開特許公報(A)

(11)特許出願公開番号

特開平5-338032

(43)公開日 平成5年(1993)12月21日

(51)Int.Cl. ⁵	識別記号	庁内整理番号	F I	技術表示箇所
B 2 9 C 65/48		7639-4F		
B 6 0 C 13/04		Z 8408-3D		
// B 2 9 K 21:00				
B 2 9 L 30:00		4F		

審査請求 未請求 請求項の数3(全 10 頁)

(21)出願番号 特願平5-40681

(22)出願日 平成5年(1993)2月5日

(31)優先権主張番号 8 3 2 4 5 5

(32)優先日 1992年2月7日

(33)優先権主張国 米国(US)

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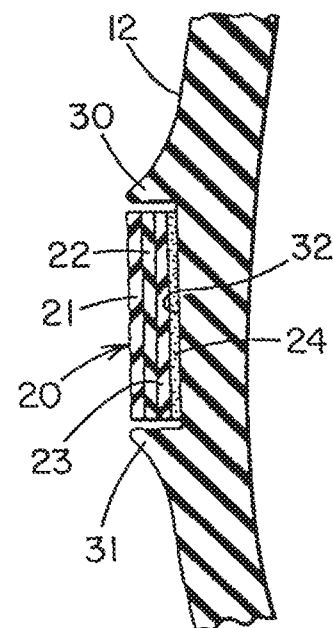
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(54)【発明の名称】 空気入りタイヤ及び空気入りタイヤを提供する方法

(57)【要約】

【目的】 装飾アップリケを有するタイヤを提供する。

【構成】 このタイヤは、事前加硫済みの弾性的な装飾アップリケ及びサイドウォールとアップリケとの間に置かれアップリケと接触している接着剤層を備える。装飾的な外側サイドウォールを有する加硫済み空気入りタイヤを提供する本発明による方法は、加硫済み空気入りタイヤの外側に加硫済みの弾性的な装飾アップリケを接着剤層により接着する段階を含む。



【特許請求の範囲】

【請求項1】 トレッド部と外側ビード及びこれらの間を延びている外側サイドウォール部を有し、このビードが車輪を受け入れる開口を定める加硫済み空気入りタイヤにおいて、事前加硫済みの弾性的な装飾アップリケ及びタイヤの外側サイドウォール上の接着剤層を備え、前記接着剤層が前記アップリケとタイヤの外側サイドウォールとの間に置かれこの両者を接着することを特徴とする空気入りタイヤ。

【請求項2】 加硫済みトレッド部と外側ビード及びこれらの間を延びている外側サイドウォール部、このビードは車輪を受け入れる開口を定め、タイヤの外側サイドウォール上の事前加硫済みの弾性的な装飾アップリケ、及び前記外側サイドウォールと前記アップリケとの間に置かれた接着剤層を備えた空気入りタイヤ。

【請求項3】 装飾的な外側サイドウォールのある加硫済み空気入りタイヤを提供する方法にして、加硫済み空気入りタイヤの外側サイドウォールに事前加硫済みの弾性的な装飾アップリケを接着剤により接着する段階を含む方法。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は車両用空気入りタイヤに関する。より特別には、本発明は、外側サイドウォール部に装飾アップリケ (decorative applique) を有する前記のようなタイヤに関する。特に、本発明は、事前に加硫された装飾アップリケを接着した加硫空気入りタイヤに関する。

【0002】

【従来技術及びその課題】 従来、装飾サイドウォールを有するタイヤはよく知られ、市場によく受け入れられている。サイドウォールの装飾部分は、普通は、着色され又は白色のゴムと共に黒色ゴムを共通押出しすることにより形成され、得られた押出し品はタイヤのサイドウォールに添付され、加硫工程中と一緒に加硫される。この共通押出し工程は高価な素材、処理段階、及び装置を含む。更に、従来から知られている方法は、サイドウォールにおける傷、欠陥、ボイド及びその他の欠点を生じ、製造工程中の廃棄物を非常に増加させる。タイヤ製造中の着色ゴム材又は白色ゴム材を取り扱う必要性が多くの場合不便さを与えている。

【0003】 サイドウォール上に、言語、デザイン、文字、ロゴ及び類似物のような装飾を有するタイヤを設計することは普通であり、これは成型又は押出し工程を経てタイヤに導入されるが、これらもまた時間を消費しかつ費用が多くかかる。タイヤは装飾バンドを有するので、これらタイヤは、これと組合わさった特徴的な廃棄率を有し、製造原価をかなり増加させる。かかる「注文」タイヤを得るための複雑化した型の費用は、このよ

うなタイヤを平均的消費者には利用し得ないようなタイヤにする。

【0004】 未加硫タイヤと共に加硫される未加硫アップリケの例は、米国特許第5058647号に見いだされる。加硫タイヤに適用される未加硫アップリケの例は米国特許第5049220号に開示される。タイヤ上に装飾サイドウォールを適用するこれら両方法は、上述のように工程に困難さを加え、タイヤを高価にする。

【0005】 従って、現在のかかる空気入りタイヤの製造と組み合わせられ費用及び時間の消費を含まない効果的なアップリケ、及び加硫タイヤにアップリケを取り付ける方法についての要求がある。

【0006】 従って、装飾アップリケをその上に有するタイヤを提供することが本発明の目的である。

【0007】 加硫された装飾アップリケをその上に有する加硫タイヤを提供することが本発明の別の目的である。

【0008】 装飾アップリケをその上に有するタイヤを作る方法を提供することが本発明の更に別の目的である。

【0009】 加硫された装飾アップリケをその上に有する加硫タイヤを作る方法を提供することが本発明のなお別の目的である。

【0010】

【課題を解決するための手段】 以上の目的の少なくとも一つまたはそれ以上が、本明細書より明らかになる現存技術に対する本発明の利点と共に、以下説明されかつ要求される本発明により達成される。

【0011】 一般に、本発明は、トレッド部と外側ビード及びこれらの間を延びている外側サイドウォール部における改良を提供する。このビードは車輪を受け入れる開口を定め、この改良は、加硫済みの弾性的な装飾アップリケ及びタイヤの外側サイドウォール上の接着剤の層を備える。接着剤層はアップリケとタイヤの外側サイドウォールとの間に置かれ、この両者を接着する。

【0012】 本発明は、加硫済みトレッド部と外側ビード、及びこれらの間を延びている外側サイドウォール部を備え、このビードは車輪を受け入れる開口を定め、更に、タイヤの外側サイドウォール上の加硫済みの弾性的な装飾アップリケ、及び外側サイドウォールとアップリケとの間に置かれた接着剤層を備えたタイヤを提供する。

【0013】 装飾サイドウォールを有する加硫空気入りタイヤを提供する本発明による方法は、接着剤により加硫済みの弾性的な装飾アップリケを加硫空気入りタイヤの外側サイドウォールに接着する段階を含む。

【0014】

【実施例】 押出し品を成型及び／又は加硫した装飾的な外側サイドウォールを有する従前の空気入りタイヤと比較して、本発明は加硫済みタイヤの上に維持される加硫済みアップリケを提供する。より特別には、本発明は加

硫済みタイヤに接着接合された加硫済みアップリケを提供する。熟練技術者により認められるように、本発明の実行により、異なったアップリケをその上に有する異なったタイヤを製造することは不必要となる。言い換えると、タイヤ製造者は、本質的に1グループのマスタータイヤを作り、次いでこれらに種々の装飾アップリケを取り付けることが自由である。更に、本発明によるアップリケは加硫済みタイヤに取り付ける前に事前加硫されるので、このアップリケは貯蔵及び低温塑性流れに対する大きな安定性を有し、かつ未加硫アップリケより貯蔵及び取扱いが容易である。

【0015】従って、本発明により、別の装飾的な外側サイドウォールをタイヤ内に直接組み込むことなしにタイヤ自身を製造することができる。傷、欠陥、ポイド及びその他の欠点、並びに製造工程と組み合った不平衡及び弾性の変化のような問題は、サイドウォールにおいて効果的に避けられる。以下の説明から、本発明によるアップリケを有するタイヤは、タイヤの生産効率の向上及びタイヤ自身の重量軽減を提供し、従ってタイヤのより大きな均一性と完全性によりタイヤ性能を向上させるであろうことが更に認められるであろう。

【0016】付属図面の図1に示されるように、実質的に普通のデザインの空気入りタイヤが一般に番号10により示される。タイヤ10は、トレッド部11、外側サイドウォール12及び外側ビード13を備える。「外側」は、車両に取り付けられたときに観察し得るタイヤの側を意味することが理解される。総てのタイヤは2個のビードと2個のサイドウォールを有することが理解される。ビード13は車輪(図示せず)を受け入れるための開口を定め、サイドウォール12はトレッド部11とビード13との間を延びこれらを連結する。タイヤ10の組成は本発明の態様ではないが、この組成は合成ゴム及び/又は天然ゴム、繊維、カーボンブラック、耐劣化剤及び類似物のような通常の成分を含むことが理解される。

【0017】本発明によるタイヤ10には、一般に番号20で示された装飾アップリケが以下完全に説明される方法で設けられる。図2に最もよく示されるように、アップリケ20は外側層又は観察可能な層21を持つ。

「観察可能」は、その上にアップリケ20を保持するタイヤ10が完成したときに層21が観察できることを意図するものである。完成タイヤ10においてアップリケ20のその他の層はいずれも観察できないこと、又はただ一つの装飾的な観察可能な層のみが本発明の絶対的な拘束であることは不必要である。しかし、本発明の説明の便のため、ただ1個の観察可能な層21しかないアップリケが参照されるであろう。

【0018】観察可能な層21は、本発明の目的を達成するであろう適宜の材料より形成できる。好ましい実施例においては、本発明は、タイヤの「ホワイトサイドウ

オール」としてしばしば使用される形式の連続弾性リングを有するタイヤを提供する。更に以下説明されるように、アップリケは白色材料には限定されず、適宜の色彩または好みの色彩の組合せとすることができる。更に、観察可能な層21は図面に描かれたようなリングとすることができ、或いは希望の文字又は類似のもののような適宜のその他の形状とすることもできる。更に、観察可能な層21には多数の色彩、デザイン、マーク、肌理、文字、その他を設けることができる。

【0019】連続リング状アップリケ20の好ましい組成の一例は、通常のホワイトサイドウォール材料である。かかる材料は、ゴム、例えばクロロブチルゴム、天然ゴム、及びエチレンプロピレンジエン共重合体(EO DM)、及びこれらの混合物、並びに白色用の二酸化チタンのような着色剤のような成分を含むことが知られる。適宜の色彩又は希望の色彩の組合せを有する観察可能な層21を形成するために、ここに参照文献として組み込まれた米国特許第4987192号に開示されたようなその他の着色剤を拘束なしに使用することができる。更に、例えば静的引っ張り弾性係数の改良のために、メタクリル亜鉛のようなその他の成分を観察可能な層21の組成に使用することができる。メタクリル亜鉛は、米国特許第4500466号及び第4495326号に例示される。サイドウォールにおけるメタクリル亜鉛含有ゴム材料の使用は、米国特許第4929684号に開示される。観察可能な層21に加えられるその他の成分の例は、シリカ又はその類似物のような強化剤を含むことができる。

【0020】例示のみのものであるが通常の白色ウォール材料の組成が下の表1に示される。この材料は適宜の通常の方法で、これを形成し加硫することができる。

【0021】

【表1】

表 I
白色ウォール材料組成例

成分	分量 ^a
クロロブチルゴム	50.0
天然ゴム	30.0
EPDM	20.0
二酸化チタン	35.0
珪酸マグネシウム	23.0
クレイ	22.0
ウルトラマリンブルー	0.6
ステアリン酸	1.0
ワックス	2.5
オイル	3.0
粘着付与剤	2.0
酸化亜鉛	12.0
硫黄	0.5
促進剤	2.25

a) 重量パート

観察可能な層21は、これをタイヤに直接取り付けるともでき、本発明の範囲内にある。しかし、観察可能な層21は、選択的な中間層又はバリヤ層22に取り付けられることが好ましい。バリヤ層22の目的は、酸化防止剤のようなタイヤ10中のある種の成分が観察可能な層21に達してこれを変色させることを防ぐことである。例として、一つの好ましいバリヤ層22は、クロロブチルゴムのようなハロブチルゴムと天然ゴムとの混合物で構成される。

【0022】バリヤ層22は本発明の目的を達成するであろう適宜の材料から形成することができ、また、バリヤ層は以下更に完全に説明されるような接着剤物質とすることもできるが、弾性バリヤ層の組成の例が表IIに与えられる。

【0023】

【表2】

表 II
弾性バリヤ層組織の例

成分	分量 ^a
クロロブチルゴム	92.0
天然ゴム	4.0
SBR ^a	4.0
カーボンブラック	70.0
オイル	13.0
酸化マグネシウム	0.3
酸化亜鉛	2.0
ステアリン酸	1.5
粘着付与剤	0.3
硫黄	0.3
促進剤	0.7

b) 重量パート

c) スチレンブタジエンゴム

本発明の別の実施例においては、内側層又は融和層23が観察可能な層21に直接取り付けられ、又は図2に描かれたようにバリヤ層22とタイヤ10のサイドウォール12とに取り付けられる。「融和」層23により、この層は、アップリケ20をその上に維持するタイヤ10の材料と実質的に同じか、又はタイヤ材料と融和性を有する材料で構成されることを意味すると理解される。例えば、アップリケ20がタイヤ10のサイドウォール12上に維持され、かつサイドウォール12があるサイドウォール材料で構成されるとすれば、融和層23は実質的に同じサイドウォール材料で形成される。

【0024】サイドウォール材料の組成の一例が下の表IIIに示される。

【0025】

【表3】

表 III
サイドウォール材料組成例

成分	分量 ^a
ポリブタジエンゴム	65.0
天然ゴム	35.0
カーボンブラック	50.0
オイル	10.4
酸化亜鉛	1.6
ステアリン酸	1.2
酸化防止剤	4.8
ワックス	2.4
粘着付与剤	3.2
硫黄	2.6
促進剤	0.8

d) 重量パート

アップリケ20は以下説明される接着材料によりタイヤ10上に維持される。融和層23を持ったアップリケ20は、もしこれがアップリケをその上に維持するタイヤ10の材料と同じか又は実質的に同じ材料で形成されるならば、容易にタイヤ10に接着されるであろう。例えば、アップリケ20がタイヤ10のサイドウォール12上に維持されるならば、そのときは、融和層23はサイドウォール12のサイドウォール材料と同じか又は実質的に同じゴム材料で形成されることが好ましい。勿論、融和層23は、これを別の融和性のゴム又はその他の適切な材料のような異なった材料で形成することができ、これも本発明の範囲内である。更に、アップリケ20は適宜数の層を含むことができ、これも本発明の範囲内である。例えば、図4に示されるように、アップリケ20は、接着剤層24で接着された観察可能な層21だけを含むことができる。

【0026】アップリケ20は、限定なしに適宜の通常の技術によりこれを構成できる。例えば、観察可能な層21を押し出すことができ、又は観察可能な層21及び／又はバリヤ層22と融和層23と一緒に押し出すこと

ができる。これらの層もまた構成構造に対しカレンダー掛けされるストリップを備えることができ、又はこれを型で切断しシートを形成することもできる。アップリケ20を製造する実際の方法は本発明にとっては重要でない。しかし、ここに説明される方法においては、アップリケ20が加硫済みタイヤ10に取り付けられるより前に事前加硫されることが重要である。アップリケの加硫は、加熱及び／又は化学的加硫又は高エネルギー照射のような適宜の通常の方法により、これを行い得る。

【0027】アップリケ20は、図3に番号24で示されたような、これとタイヤ10とに接合されている接着層によりタイヤ10上に維持される。この図において、接着剤24は、アップリケ20とタイヤ10のサイドウォール12との間に位置決めされ又は挟まれた層として描かれる。接着剤24は、アップリケ20をタイヤ10にしっかりと接着する適宜の接着剤である。適切な接着剤の例は、ウレタン、シアノアクリレート、エポキシ、

表 IV
ウレタン接着剤

成分	重量パート
アジブレンL-367 ^e	100
HGO可塑剤 ^f	20
CTB810 ^g	1
アセトン（溶剤）	20

e) ポリエーテル系ウレタン、デュボンより入手可能、6.15ないし6.55%のイソシアン酸塩含有を有するとして知られる

f) ポリエチレングリコール、ユニオンカーバイド社より入手可能

g) 黒色顔料

表IVに示された接着剤は、ユニロイヤル・ケミカルズ（Uniroyl Chemicals）より入手可能のアミン硬化剤、Caytur 21の重量32部と混合されることが好ましい。

【0030】選定された特定の接着剤に応じて、アップリケ20は加熱及び／又は加圧があり又はなしでタイヤ10に接着される。例えば、Chemlok 234Bは高温（130-140℃）でかつ高压下で接着する。EP5908-29A/B及びFusor 305-1/305-2は環境温度において接着する。同様に、接着剤の硬化に要する時間も、選定された実際の接着剤に非常に依存する。

【0031】アップリケ20は、これを手でタイヤ10に取り付けてもよいし、或いは支持装置（図示せず）により取り付けられることもできる。例えば、アップリケ20が図面に示されるようにリングであれば、使用される特定の接着剤による要求に応じてアップリケに温度及び／又は圧力を加えるためにリング-板固定具を使用できる。

【0032】本発明により、接着剤層24のような接着

ポリビニルアルコール、アクリレート、メタクリレート、ポリ塩化ビニル、ポリエステル及びこれらと類似の物より形成され、又はこれらに基づいた接着剤を包含する。熱可塑性エラストマー及び山かけ用ゴムのりもまた、パッチゴムV-10押出し用のり、パッチゴムブラシ形加硫及び山かけ用のり、及サップ-アール-タック（これらは全て登記の譲受人より入手可能である）のような接着剤として使用できる。ペンシルヴァニア州エリーのロード・ケミカル・コーポレーション（Lord Chemical Corporation）よりすべてが入手可能なEP5908-29A/B、Fusor 305-1/305-2及びChemlok 234Bもまた本発明の実施に有用な接着剤の例である。

【0028】本発明の実施に好ましいウレタン接着剤の一つは、下の表IVに表示された分量の成分を含む。

【0029】

【表4】

層もまたバリヤ層22と同様な方法でバリヤ層として機能しうる。上述の接着剤は観察可能な層12の焼けを防ぐ障壁性を持つことができる。ロクタイト・コーポレーション（Loctite Corporation）からのLoctite 447のようなシアノアクリレートが、バリヤ層として機能しうる接着剤の一例である。接着剤が障壁性を有する場合は、別のバリヤ層22は、これを使用してもよいし使用しなくてもよい。いかなる接着剤も、硬化したときは、タイヤ10の焼け又はアップリケ20の劣化から材料を保護し、これは本発明の範囲内である。

【0033】本発明により、かつ付属図面の図4に例示されたように、接着剤層24は、以下説明される理由により、アップリケ20をタイヤに接着するために使用される接着剤組成を複数含むことができる。例えば、第1の接着剤部分A、第2の接着剤部分B、又は実際に適宜の数のかかる接着剤部分を使用できる。例えば、第3の接着剤部分Cを使用できる。

【0034】本発明の一実施例においては、第1の接着剤部分Aのような少なくとも1個の接着剤部分を設けることが好ましく、この部分Aは、第2の接着剤部分Bのような別の接着剤部分の硬化速度より遅い硬化速度又は「固化」速度を有する接着剤組成を含む。この方法で、タイヤ製造運転中に、より遅い硬化速度の接着剤のみが使用される場合よりも早くタイヤを更に処理し又はその他の取り扱いを行うことができ、アップリケ20とタイ

ヤ10との間に強い接着強度を与える硬化速度のより速いある種の接着剤を使用することができる。遅い接着剤が最終的に固化したときに、最大の接着強度が達成される。

【0035】接着剤層24の一例は、第1及び第3の部分AとBとを有し、その名は実質的に同様なウレタン又はエポキシの接着剤成分を有する接着剤である。第2の接着剤の部分Bは、固化速度がウレタン又はエポキシの接着剤よりも速いとして知られたシアノアクリレート接着剤成分を含む。適宜の接着剤の組合せも使用できることは勿論である。例えば、第1の部分Aをウレタンとし、第2の部分Bをシアノアクリレートとし、そして部分Cをエポキシとすることができる。また、選定された接着剤の性質に基づき、ウレタン又はエポキシの接着剤は「速い」接着剤であり、一方、別の接着剤は「遅い」硬化速度の性質を持つ。同様に、シアノアクリレートは「遅い」硬化速度の接着剤であり、実際に選定された接着剤によるこれら全ての接着剤は本発明の範囲内にある。また、第1、第2及び第3の部分A、B及びCは、図4に明瞭な層として示されるが、各部分の接着剤の混合及び／又は反応が生じ得ることが理解される。

【0036】図面では、アップリケ20がタイヤ10に直接接着されるように描かれるが、タイヤ10は、アップリケ20が接着されるタイヤ10内に作られタイヤと一緒に硬化された、バリア層22と同様のバリア層（図示せず）、又は融和層23と同様の融和層（図示せず）及び類似物のような層を有することが理解される。

【0037】本発明による方法は、上述の適切な接着剤による上述のアップリケ20のタイヤ10への接着の段階を含む。更に、ある種の接着剤は、ロード・ケミカル・コーポレーションよりのChemlok 7701又はTS3135-57、又はその他の適切な下塗り剤によるような、接着すべき表面の下塗りの段階を必要とする。更に、接着される面は、接合技術における普通の方法で接合の強化のために平滑にされ又は粗面にされる。その他の段階も必要に応じて行われるであろう。約0.89 kg/cm (5ポンド/インチ) から約26.78 kg/cm (150ポンド/インチ) 又はこれ以上、好ましくは約4.46 kg/cm (15ポンド/インチ) から約17.86 kg/cm (100ポンド/インチ) の接着強度又は剝離強度が得られるように、選定された接着剤がアップリケ20をタイヤ10に接着できることが好ましい。

【0038】本発明による方法の一例は、離型剤、油、ごみ等を除去するために溶剤によるアップリケ20及びタイヤ10の払拭を含む。次いで接着すべき面はRMA1又はRMA2標準バフテクスチャー、又はこれと同様にバフ掛けされる。次いで、バフ掛けによる遊離微粒子が別の溶剤により払拭される。次に、表面は、使用される接着剤の性質に応じて必要ならば下塗りされる。次

いで、アップリケ20、タイヤ10又は両者に接着剤が塗布される。次いで、所望の位置で、加熱及び加圧があり又はなしで、アップリケ20がタイヤ10に対して接合され又は押し付けられる。

【0039】上述のように、タイヤ10は技術の通常の適宜設計のものであることが好ましい。しかし、タイヤ10には、中間に溝32を形成している隆起30と31とを設けることができる（図3）。装飾サイドウォールを形成するように使用されるときは、図面に示されるように隆起30と31とは同心とされる。アップリケ20は、これを溝32内に置くことによりタイヤ10に対して固定される。隆起30と31とは、アップリケの面の位置決め支援に加えて、タイヤ10が車両で使用されるときアップリケ20にある程度の保護を与える。緑石との接触によるような擦損は、一般に装飾サイドウォールとタイヤとに関連し常に問題であるが、これはアップリケ20を溝32内に置くことにより実質的に軽減することができる。

【0040】アップリケ20は、約0.127 mm (5ミル) から約63.5 mm (500ミル) までのような種々の厚さのものとすることができる。より好ましくは、アップリケ20は約1.27 mm (50ミル) から約2.386 mm (90ミル) の厚さとしてすることができる。上述のように合成アップリケ20を形成するために使用される個々の層もまたこれら厚さの範囲内で変動できる。アップリケ20の実際の厚さを決定するために用いられる一つの要因は、熟練技術者により認められるであろうように、希望の擦損抵抗性、従って隆起30と31の寸法及び溝30の深さであろう。

【0041】上に略述したように、タイヤ10は、これに相互に接着される実際のアップリケ20に拘わりなく、これを製造することができる。タイヤ10は、アップリケ20有り、又は何かの適当な色彩、意匠又はこれらと類似の事項のアップリケ20有りの状態で、車両に取り付けられる、従って、従来技術によるような費用及び時間を要する特別の製造手順を必要としない。

【0042】更に、一方のサイドウォールが平滑で、タイヤ反対側の他方のサイドウォールがアップリケ20受け用の溝32を有するタイヤを提供することは本発明の範囲内である。「平滑」サイドウォール（図示せず）は、本技術において「ブラックウォール」として普通に知られる。本発明のかかる実施例により、ただ1種のマスタータイヤだけを作ることだけしか必要でなく、これをブラックウォール又は装飾サイドウォールを有するタイヤのいずれにも使用できる。また、かかる実施例により、使用者の希望のように、どちらのサイドウォールも「外側」サイドウォールとして使うことができる。

【0043】

【一般的実験】本発明の実施を例示するために、多数の装飾アップリケ、装飾アップリケを有するタイヤ、及び

試験用標本が上に説明された方式に従って調製された。行われた試験は、接着試験、緑石擦損試験及び室内路上摩耗模擬試験である。行われた実際の試験は以下各個に説明されるであろう。

【0044】接着剥離試験

接着試験においては、下に更に説明される多数の試験用パッドに対してASTM 413と同様の試験が行われた。この試験においては、2プライの繊維で裏打ちされたサイドウォール材料よりなる標準の152.4×152.4×38.1mm (6×6×1.5インチ) の接着パッドが作られた。次いでこれらのパッド部材は型の中で164.4℃ (328°F) において20分間加硫された。次に、このパッド部材は下に説明されるような適切な接着剤と一緒に接着された。(大きなパッドから型により25.4×152.4mm (1×6インチ) に切断され) 接着されたパッドが、インストロン引張り試験器を使用して室温で接着強度について試験された。

【0045】例1

各が25.4×152.4mm (1×6インチ) のパッド部材が溶剤で払拭され、RMA1又はRMA2にバフ掛けされ、再び溶剤で払拭された。次に、Chemlok 234B接着剤がブラシにより塗布され、次いでパッドは手で互いに接合される。

【0046】各パッドは152.4mm (6インチ) プラテンの加硫プレス内に置かれ、上方のプラテンだけが表面温度150℃に加熱され、2.81g/cm² (40psi) で45分間加熱される。接着剥離強度が測定され、結果は長さ1cm当たり6.43kg (1インチ当たり36ポンド) であった。

【0047】例2

別のパッド部材は、使用接着剤がFusor 305-1/305-2であり、かつこれがスパチュラで塗布された点を除いて例1と同様に作られた。各パッドに室温で約0.21kg/cm² (3psi) の圧力が24時間加えられた。接着剥離強度は8.93kg/cm (50ポンド/インチ) であった。

【0048】緑石擦損試験

緑石擦損試験は、実際のアップリケが付けられた実際のタイヤについて行われた。試験タイヤは助手席側の前輪位置で車両に取り付けられ、このタイヤは約8.0から24.1km/hr (5から15マイル/時) の車両速度で試験用緑石に対して直角に駆動される。緑石に対して完全に50回転された。かなりの数の回転後に層の剥離が生じないならば、タイヤは試験に合格したと判断される。試験タイヤの外見は、同じ擦損試験を行われた通常のホワイトウォールのタイヤのそれと比較される。

【0049】例3

表 V

走行試験データ

段階	時間 (hr)	設計荷重 ^a
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その上に溝を有する通常の加硫タイヤが溶剤で払拭された。アップリケはRMA1又はRMA2にバフ掛けされ、溶剤で払拭された。Chemlok 234Bがタイヤとアップリケの両方に塗布され、1時間空気乾燥を受けた。次いで、リングー板固定具を用い150℃において30分間、2.11kg/cm² (30psi) でアップリケがタイヤに取り付けられる。このように作られたサイドウォールは上述の擦損試験を通過した。

【0050】例4

タイヤとアップリケの両者がLord Chemical TS3135-57で下塗りされ5分間空気乾燥された点を除いて上と同様に別のタイヤが作られた。次いで、Fusor 305-1/305-2がスパチュラにより溝に塗布された。アップリケをタイヤに固定するために、室温で48時間、約0.35kg/cm² (5psi) においてリングー板固定具が使用された。このタイヤは試験を通過した。

【0051】例5

接着剤として上述の表IVのウレタン接着剤組成を使用して例4におけるように別のタイヤが調製された。70℃、約0.35kg/cm² (5psi) において45分間、リングー板固定具によりアップリケが取り付けられた。このタイヤは緑石擦損試験を通過した。

【0052】例6

接着剤Lord Chemical EP5908-29A/B、及びこの接着剤の2個の塗膜を使用し例4におけると同様に別のタイヤが調製された。アップリケは室温で手により取り付けられ、上の例3-5におけるタイヤよりも多少の余裕をもって擦損試験を通過した。

【0053】例7

通常の技術でタイヤ内に直接作られた白色部分を有する市販のホワイトサイドウォールタイヤは、15回転以下の緑石擦損試験後に、見えずかつ容認しがたい外見となった。

【0054】室内路面摩耗模擬試験

室内試験は車両と荷物との重量、温度条件及び車両速度を模擬する試験装置を使用して管理された条件下で行われた。

【0055】例8

タイヤは上の例3に従い調製された。タイヤはその諸元に従って空気圧2.25kg/cm² (32psi) にされる。表Vに報告された各種の時間及び各種の荷重について約37.8℃ (100°F) の周囲温度で80.5km/hr (50マイル/時) の速度でタイヤ走行による耐久試験が行われた。

【0056】

【表5】

1	4	100%
2	6	100%
3	24	100%
4	8	130%
5	8	145%
6	8	160%
7	8	175%
8	8	190%

h) 正常使用時にタイヤが負担すべく設計された荷重に対する%

アップリケの層剥離が見られず、このタイヤは耐久試験を通過したことが分かった

例9

タイヤは、リングー板固定具が表面温度110℃に加熱され、かつ約0.35 kg/cm² (5 psi) の圧力が約10分間加えられたことを除いて上の例4におけると同様に調製された。例8のタイヤに行われたのと同じ耐久試験が同様にこのタイヤについて行われ、このタイヤは接着ラインの厚さが薄すぎたため余裕のある結果が示された。

【0057】例10

例8によりタイヤが調製された。タイヤは空気圧1.69-1.83 kg/cm² (24-26 psi) とされ、次いで-40℃において2.5時間冷却された。次いで、48.3から80.4 km/hr (30から50マイル/時) で24分間走行した。アップリケが剥離することなしに、このサイクルが25回繰り返された。

【0058】例11

例9におけるようなタイヤが、アップリケの剥離することなく例10におけると同様に試験された。

【0059】以上の説明に基づいて、ここに説明されたアップリケ及び方法の使用は、前述の目的を達成したであろうことが明らかにされた。また、本発明の方法が上にアップリケを有する種々のタイヤの製造に実用できることが熟練技術者により認められた。同様に、アップリケをタイヤに接着するために使用される接着剤及び温度と圧力は上に説明されたように変動するであろう。

【0060】従って、請求された本発明の範囲内に明らかにくる任意の変動、従ってアップリケ層の特定の数、色彩及び形状、その組合せ、使用される接着剤、もし使われるならば下塗り、及びバフ掛け及びその他の方法の選定は、ここに開示され説明された本発明の精神より離れることなく、これを行うことができる。更に本発明の範囲は請求される本発明の範囲内にくる総ての変更及び変化を含む。

【0061】本発明の実施態様は次の通りである。

【0062】1. トレッド部と外側ビード及びこれらの間を延びている外側サイドウォール部を有し、このビードが車輪を受け入れる開口を定める加硫済み空気入りタイヤにおいて、事前加硫済みの弾性的な装飾アップリケ及びタイヤの外側サイドウォール上の接着剤層を備

え、前記接着剤層が前記アップリケとタイヤの外側サイドウォールとの間に置かれこの両者を接着することとを特徴とする改良。

【0063】2. 前記装飾アップリケが観察可能な層及びバリア層を備えた実施態様1に説明の空気入りタイヤ。

【0064】3. 前記観察可能な層がクロロブチルゴムと天然ゴム及びエチレンプロピレンジエンターポリマーを含む実施態様2に説明の空気入りタイヤ。

【0065】4. 前記バリア層がクロロブチルゴム及び天然ゴムを含む実施態様2に説明の空気入りタイヤ。

【0066】5. 前記装飾アップリケが観察可能な層及びタイヤと融和する第2の層を備えた実施態様1に説明の空気入りタイヤ。

【0067】6. 前記第2の層がタイヤの外側サイドウォールの材料と実質的に同様の材料を含む実施態様5に説明の空気入りタイヤ。

【0068】7. 前記接着剤層が、ウレタン、シアノアクリレート、エポキシ、ポリビニルアルコール、アクリレート、メタクリレート、ポリ塩化ビニル及びポリエステル接着剤よりなるグループから選定された接着剤組成を含む実施態様1に説明の空気入りタイヤ。

【0069】8. 前記接着剤層は、タイヤからの成分による前記アップリケの焼けを防ぐように、焼け障壁特性を有する接着剤よりなるグループから選定される実施態様1に説明の空気入りタイヤ。

【0070】9. 加硫済みトレッド部と外側ビード及びこれらの間を延びている外側サイドウォール部、このビードは車輪を受け入れる開口を定め、タイヤの外側サイドウォール上の事前加硫済みの弾性的な装飾アップリケ；及び前記外側サイドウォールと前記アップリケとの間に置かれた接着剤層を備えた空気入りタイヤ。

【0071】10. 前記アップリケに最寄りの前記外側サイドウォール上に維持され、かつ前記タイヤから外向きに延びる第1及び第2の隆起を更に備え、前記第1及び第2の隆起間に溝を定める実施態様9に説明の空気入りタイヤ。

【0072】11. 前記アップリケが前記溝の中の位置決めされる実施態様10に説明の空気入りタイヤ。

【0073】12. 前記装飾アップリケが観察可能な層及びバリア層を備えた実施態様9に説明の空気入りタイ

ヤ。

【0074】13. 前記装飾アップリケが観察可能な層及びタイヤと融和する第2の層を備えた実施態様9に説明の空気入りタイヤ。

【0075】14. 前記接着剤層は、タイヤからの成分による前記アップリケの焼けを防ぐように、焼け障壁特性を有する接着剤よりなるグループから選定される実施態様9に説明の空気入りタイヤ。

【0076】15. 前記接着剤層が少なくとも2個の部分10を備え、前記部分の各が接着剤組成を含む実施態様9に説明の空気入りタイヤ。

【0077】16. 前記第1の部分の前記接着剤組成が前記第2の部分の前記接着剤組成の硬化速度よりも遅い硬化速度を有する実施態様15に説明の空気入りタイヤ。

【0078】17. 前記接着剤層が前記第1の部分と同じ接着剤組成を有する第3の部分11を備えた実施態様16に説明の空気入りタイヤ。

【0079】18. 前記第1及び第3の部分11がウレタン及びエポキシよりなるグループから選定された成分を有する接着剤を備え、更に前記第2の部分12がシアノアクリレート13を有する実施態様17に説明の空気入りタイヤ。

【0080】19. 装飾的な外側サイドウォールのある加硫済み空気入りタイヤを提供する方法にして、加硫済み空気入りタイヤの外側サイドウォールに事前加硫済みの弾性的な装飾アップリケを接着剤により接着する段階を含む方法。

【0081】20. 前記アップリケを取り付けるためにタイヤの表面を下塗り剤で下塗りする段階を更に含む実

施態様19に説明の方法。

【0082】21. 前記接着段階の前に前記アップリケにバフ掛けする段階を更に含む実施態様19に説明の方法。

【0083】22. 少なくとも第1及び第2の接着剤組成により前記アップリケをタイヤに接着する段階を更に含む実施態様19に説明の方法。

【0084】23. 前記第1の接着剤組成が前記第2の接着剤組成の硬化速度より遅い硬化速度を有する実施態様22に説明の方法。

【0085】24. 前記第1の接着剤組成と実質的に同じ第3の接着剤組成により前記アップリケをタイヤに接着する段階を更に含む実施態様23に説明の方法。

【図面の簡単な説明】

【図1】本発明の態様に従って、接着されたアップリケをその上に有するタイヤの立面図である。

【図2】図1に示されたような装飾アップリケの部分的な断面斜視図である。

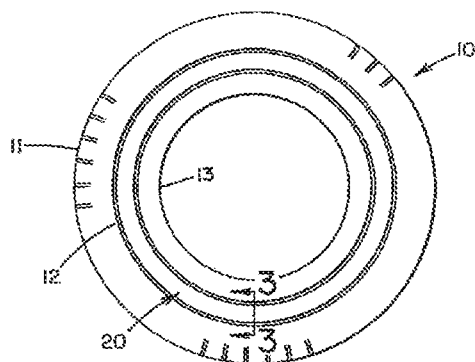
【図3】実質的に図1の線3-3に沿って得られる図1に示されたタイヤの部分的断面図である。

【図4】図1に示された装飾アップリケの別の実施例の部分的な断面斜視図である。

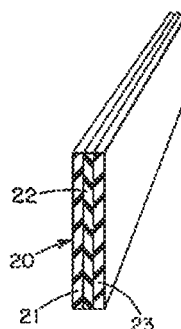
【符号の説明】

- 10 空気入りタイヤ
- 11 トレッド部
- 12 外側サイドウォール
- 13 外側ビード
- 20 装飾アップリケ

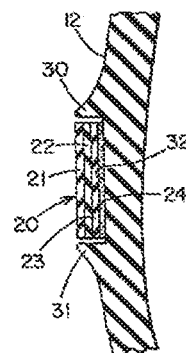
【図1】



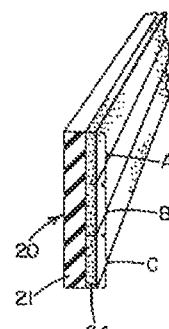
【図2】



【図3】



【図4】



フロントページの続き

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Espacenet

Bibliographic data: JP2014213718 (A) — 2014-11-17

PNEUMATIC TIRE AND PNEUMATIC TIRE MANUFACTURING METHOD

Inventor(s): SETO HIDEKI ± (瀬戸 秀樹)
Applicant(s): YOKOHAMA RUBBER CO LTD ± (横浜ゴム株式会社)
Classification: - **international:** *B29D30/72; B60C13/00; B60C13/04*
- **cooperative:**
Application number: JP20130092476 20130425 Global Dossier
Priority number(s): JP20130092476 20130425
Also published as: JP6115287 (B2)

Abstract of JP2014213718 (A)

PROBLEM TO BE SOLVED: To provide a pneumatic tire and a pneumatic tire manufacturing method capable of forming a colorful display article and holding the display article for a long period of time. **SOLUTION:** A pneumatic tire comprises a laminate 10 including a plurality of film layers 11 to 13 arranged on a tire surface and a base rubber layer 14 arranged under the film layers 11 to 13. The film layers 11 to 13 comprise a thermoplastic resin or a thermoplastic elastomer composition that is a mixture of the thermoplastic resin and the elastomer, the film layers 11 to 13 are colored differently from one another and from the base rubber layer 14, and a plurality of openings 15 having different depths is formed in the film layers 11 to 13 by laser processing. The two or more film layers 12, 13 colored differently from the outermost film layer 11 are exposed via these openings 15 having the different depths.

(19) 日本国特許庁(JP)

(12) 公開特許公報(A)

(11) 特許出願公開番号

特開2014-213718

(P2014-213718A)

(43) 公開日 平成26年11月17日(2014.11.17)

(51) Int. Cl.	F 1	テーマコード (参考)
B 6 0 C 13/00 (2006.01)	B 6 0 C 13/00	E 4 F 2 1 2
B 6 0 C 13/04 (2006.01)	B 6 0 C 13/04	Z
B 2 9 D 30/72 (2006.01)	B 6 0 C 13/00	C
	B 2 9 D 30/72	

審査請求 未請求 請求項の数 14 O L (全 15 頁)

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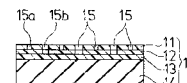
(54) 【発明の名称】 空気入りタイヤ及びその製造方法

(57) 【要約】

【課題】 色彩に富んだ表示物を形成することが可能であり、その表示物を長期間にわたって保持することを可能にした空気入りタイヤ及びその製造方法を提供する。

【解決手段】 タイヤ表面に配置された複数層のフィルム層11～13と該フィルム層11～13の下側に配置された下地ゴム層14とを含む積層体10を備え、フィルム層11～13を熱可塑性樹脂又は熱可塑性樹脂とエラストマーとをブレンドした熱可塑性エラストマー組成物から構成すると共に、フィルム層11～13を互いに異なる色であって下地ゴム層14とは異なる色に着色し、フィルム層11～13にレーザー加工による深さが異なる複数の開口部15を形成し、これら深さが異なる開口部15を介して最外側のフィルム層11とは色が異なる2層以上のフィルム層12, 13を露出させる。

【選択図】 図2



【特許請求の範囲】**【請求項 1】**

タイヤ表面に配置された複数層のフィルム層と該フィルム層の下側に配置された下地ゴム層とを含む積層体を備え、前記フィルム層を熱可塑性樹脂又は熱可塑性樹脂とエラストマーとをブレンドした熱可塑性エラストマー組成物から構成すると共に、前記フィルム層を互いに異なる色であって前記下地ゴム層とは異なる色に着色し、前記フィルム層にレーザー加工による深さが異なる複数の開口部を形成し、これら深さが異なる開口部を介して最外側のフィルム層とは色が異なる 2 層以上の層を露出させたことを特徴とする空気入りタイヤ。

【請求項 2】

前記積層体が互いに異なる色に着色された 3 層以上 10 層以下のフィルム層を含むことを特徴とする請求項 1 に記載の空気入りタイヤ。

【請求項 3】

前記フィルム層の色がカラーパレットにおいて均等に離れた 3 色を含むことを特徴とする請求項 2 に記載の空気入りタイヤ。

【請求項 4】

前記開口部を有する積層体が前記カラーパレットにおいて均等に離れた 3 色の組み合わせに基づいて描画されたカラー表示物を表示することを特徴とする請求項 3 に記載の空気入りタイヤ。

【請求項 5】

前記開口部が文字、図形、記号又は数字からなる情報表示要素を形成することを特徴とする請求項 1～4 のいずれかに記載の空気入りタイヤ。

【請求項 6】

前記開口部が会社のロゴマーク、タイヤのブランド、バーコード、タイヤサイズ、製造情報、使用条件又は使用上の注意事項からなる情報表示物を構成することを特徴とする請求項 1～5 のいずれかに記載の空気入りタイヤ。

【請求項 7】

前記積層体をサイドウォール部の外壁に配置したことを特徴とする請求項 1～6 のいずれかに記載の空気入りタイヤ。

【請求項 8】

タイヤ表面に配置された複数層のフィルム層と該フィルム層の下側に配置された下地ゴム層とを含む積層体を備え、前記フィルム層を熱可塑性樹脂又は熱可塑性樹脂とエラストマーとをブレンドした熱可塑性エラストマー組成物から構成すると共に、前記フィルム層を互いに異なる色であって前記下地ゴム層とは異なる色に着色した空気入りタイヤを加硫した後、前記フィルム層にレーザー加工により深さが異なる複数の開口部を形成し、これら深さが異なる開口部を介して最外側のフィルム層とは色が異なる 2 層以上の層を露出させることを特徴とする空気入りタイヤの製造方法。

【請求項 9】

前記積層体が互いに異なる色に着色された 3 層以上 10 層以下のフィルム層を含むことを特徴とする請求項 8 に記載の空気入りタイヤの製造方法。

【請求項 10】

前記フィルム層の色がカラーパレットにおいて均等に離れた 3 色を含むことを特徴とする請求項 9 に記載の空気入りタイヤの製造方法。

【請求項 11】

前記開口部を有する積層体が前記カラーパレットにおいて均等に離れた 3 色の組み合わせに基づいて描画されたカラー表示物を表示することを特徴とする請求項 10 に記載の空気入りタイヤの製造方法。

【請求項 12】

前記開口部が文字、図形、記号又は数字からなる情報表示要素を形成することを特徴とする請求項 8～11 のいずれかに記載の空気入りタイヤの製造方法。

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【請求項 13】

前記開口部が会社のロゴマーク、タイヤのブランド、バーコード、タイヤサイズ、製造情報、使用条件又は使用上の注意事項からなる情報表示物を構成することを特徴とする請求項 8～12 のいずれかに記載の空気入りタイヤの製造方法。

【請求項 14】

前記積層体をサイドウォール部の外壁に配置したことを特徴とする請求項 8～13 のいずれかに記載の空気入りタイヤの製造方法。

【発明の詳細な説明】

【技術分野】

【0001】

本発明は、任意の表示物を備えた空気入りタイヤ及びその製造方法に関し、更に詳しくは、色彩に富んだ表示物を形成することが可能であり、その表示物を長期間にわたって保持することを可能にした空気入りタイヤ及びその製造方法に関する。

【背景技術】

【0002】

空気入りタイヤは、それを構成するゴム組成物に補強材としてカーボンブラックが配合されているため全体的に黒色である。そのため、空気入りタイヤを鮮やかな色彩で彩ることは技術的に困難である。

【0003】

これに対して、インクジェット方式等の印刷によりタイヤ側面に文字や絵柄等の表示物を描写すること（例えば、特許文献 1 参照）が提案されている。しかしながら、インクジェット方式等の印刷によりタイヤ側面に表示物を設けた場合、日差しや風雨に晒される空気入りタイヤにおいてはインクが剥がれ落ち易いので、その表示物を長期間にわたって表示することが難しいという問題がある。

【先行技術文献】

【特許文献】

【0004】

【特許文献 1】特開 2012-131508 号公報

【発明の概要】

【発明が解決しようとする課題】

【0005】

本発明の目的は、色彩に富んだ表示物を形成することが可能であり、その表示物を長期間にわたって保持することを可能にした空気入りタイヤ及びその製造方法を提供することにある。

【課題を解決するための手段】

【0006】

上記目的を達成するための本発明の空気入りタイヤは、タイヤ表面に配置された複数層のフィルム層と該フィルム層の下側に配置された下地ゴム層とを含む積層体を備え、前記フィルム層を熱可塑性樹脂又は熱可塑性樹脂とエラストマーとをブレンドした熱可塑性エラストマー組成物から構成すると共に、前記フィルム層を互いに異なる色であって前記下地ゴム層とは異なる色に着色し、前記フィルム層にレーザー加工による深さが異なる複数の開口部を形成し、これら深さが異なる開口部を介して最外側のフィルム層とは色が異なる 2 層以上の層を露出させたことを特徴とするものである。

【0007】

また、上記目的を達成するための本発明の空気入りタイヤの製造方法は、タイヤ表面に配置された複数層のフィルム層と該フィルム層の下側に配置された下地ゴム層とを含む積層体を備え、前記フィルム層を熱可塑性樹脂又は熱可塑性樹脂とエラストマーとをブレンドした熱可塑性エラストマー組成物から構成すると共に、前記フィルム層を互いに異なる色であって前記下地ゴム層とは異なる色に着色した空気入りタイヤを加硫した後、前記フィルム層にレーザー加工により深さが異なる複数の開口部を形成し、これら深さが異なる

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開口部を介して最外側のフィルム層とは色が異なる２層以上の層を露出させることを特徴とするものである。

【発明の効果】

【０００８】

本発明では、空気入りタイヤが複数層のフィルム層と下地ゴム層とを含む積層体を備え、フィルム層を熱可塑性樹脂又は熱可塑性エラストマー組成物から構成すると共に、フィルム層を互いに異なる色であって下地ゴム層とは異なる色に着色し、フィルム層にレーザー加工による深さが異なる複数の開口部を形成し、これら深さが異なる開口部を介して最外側のフィルム層とは色が異なる２層以上の層を露出させることにより、開口部の形状又は配置に基づいて色彩に富んだ表示物を形成することが可能である。しかも、開口部の形状又は配置に基づいて形成された表示物は、インクジェット方式等の印刷により形成された表示物とは異なって、日差しや風雨に晒される空気入りタイヤにおいても剥がれ落ちを生じ難いので、その表示物を長期間にわたって表示することができる。

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【０００９】

本発明において、積層体は互いに異なる色に着色された３層以上１０層以下のフィルム層を含むことが好ましい。これにより、一層鮮やかな表示物を形成することができる。特に、フィルム層の色がカラーパレットにおいて均等に離れた３色を含むことが好ましい。そして、開口部を有する積層体がカラーパレットにおいて均等に離れた３色の組み合わせに基づいて描画されたカラー表示物を表示することが好ましい。

【００１０】

開口部は文字、図形、記号又は数字からなる情報表示要素を形成しても良い。そして、開口部は会社のロゴマーク、タイヤのブランド、バーコード、タイヤサイズ、製造情報、使用条件又は使用上の注意事項からなる情報表示物を構成しても良い。これら情報表示要素又は情報表示物についても鮮やかな表示を実現することができる。

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【００１１】

積層体はサイドウォール部の外壁に配置することが好ましい。この場合、鮮やかな色彩を有する表示物をタイヤデザインの一部として有効に活用することができる。

【図面の簡単な説明】

【００１２】

【図１】本発明の実施形態からなる空気入りタイヤを示す子午線断面図である。

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【図２】図１の空気入りタイヤにおけるフィルム層と下地ゴム層とからなる積層体を示す断面図である。

【図３】フィルム層に開口部を形成する工程を示す断面図である。

【図４】フィルム層と下地ゴム層とからなる積層体の変形例を示す断面図である。

【図５】開口部により描写されるカラー表示物の一例を示す平面図である。

【図６】開口部により描写される情報表示物の一例を示す平面図である。

【図７】開口部により描写される情報表示物の他の例を示す平面図である。

【図８】開口部により描写される情報表示物の他の例を示す平面図である。

【発明を実施するための形態】

【００１３】

以下、本発明の構成について添付の図面を参照しながら詳細に説明する。図１～図３は本発明の実施形態からなる空気入りタイヤを示すものである。図１に示すように、本実施形態の空気入りタイヤは、タイヤ周方向に延在して環状をなすトレッド部１と、該トレッド部１の両側に配置された一対のサイドウォール部２、２と、これらサイドウォール部２のタイヤ径方向内側に配置された一対のビード部３、３とを備えている。

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【００１４】

一対のビード部３、３間にはカーカス層４が装架されている。このカーカス層４は、タイヤ径方向に延びる複数本の補強コードを含み、各ビード部３に配置されたビードコア５の廻りにタイヤ内側から外側へ折り返されている。ビードコア５の外周上には断面三角形のゴム組成物からなるビードフィラー６が配置されている。

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【0015】

一方、トレッド部1におけるカーカス層4の外周側には複数層のベルト層7が埋設されている。これらベルト層7はタイヤ周方向に対して傾斜する複数本の補強コードを含み、かつ層間で補強コードが互いに交差するように配置されている。ベルト層7において、補強コードのタイヤ周方向に対する傾斜角度は例えば $10^{\circ} \sim 40^{\circ}$ の範囲に設定されている。ベルト層7の補強コードとしては、スチールコードが好ましく使用される。ベルト層7の外周側には、高速耐久性の向上を目的として、補強コードをタイヤ周方向に対して例えば 5° 以下の角度で配列してなる少なくとも1層のベルトカバー層8が配置されている。ベルトカバー層8の補強コードとしては、ナイロンやアラミド等の有機繊維コードが好ましく使用される。また、タイヤ内壁にはカーカス層4に沿ってインナーライナー層9が配設されている。

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【0016】

なお、上述したタイヤ補強構造は空気入りタイヤにおける代表的な例を示すものであるが、これに限定されるものではない。

【0017】

上記空気入りタイヤにおいて、サイドウォール部2の外壁には、図2に示すように、タイヤ表面に配置された3層のフィルム層11、12、13と該フィルム層11～13の下側に配置された下地ゴム層14とを含む積層体10が付加されている。下地ゴム層14は積層体10に隣接するゴム層とフィルム層11～13との間に介在するタイゴム層である。

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【0018】

上述したフィルム層11～13はいずれも熱可塑性樹脂又は熱可塑性樹脂とエラストマーとをブレンドした熱可塑性エラストマー組成物から構成されている。これらフィルム層11～13の厚さは特に限定されるものではないが、例えば $10 \mu\text{m} \sim 100 \mu\text{m}$ の範囲に設定することが望ましい。フィルム層11～13は互いに異なる色であって、かつ下地ゴム層14とは異なる色に着色されている。そして、フィルム層11～13にはレーザー加工による深さが異なる複数の開口部15が形成され、これら深さが異なる開口部15を介して最外側のフィルム層11とは色が異なる2層のフィルム層12、13が露出している。より具体的には、開口部15はフィルム層11を貫通する開口部15aとフィルム層11、12を貫通する開口部15bとを含み、開口部15aを介してフィルム層12が露出する一方で開口部15bを介してフィルム層13が露出している。

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【0019】

このような空気入りタイヤを製造する場合、先ず、上述の如く積層されたフィルム層11～13と下地ゴム層14とを含む積層体10を備えた空気入りタイヤを加硫する。その後、図3に示すように、レーザー照射装置の加工ヘッド21からフィルム層11～13に対してレーザー光22を照射し、その照射部分を除去することにより、フィルム層11～13に深さが異なる複数の開口部15を形成し、これら開口部15を介して最外側のフィルム層11とは色が異なる2層のフィルム層12、13を露出させる。

【0020】

レーザー光22の照射は、加工ヘッド21を移動させながら連続的に行っても良く、或いは、加工ヘッド21を移動させながら間欠的に行っても良い。加工ヘッド21の移動速度やレーザー光22の強度を調整することにより、形成すべき開口部15の深さを適宜調整することができる。レーザーとしては、例えば、赤外線レーザー、 CO_2 （炭酸ガス）レーザー、YAGレーザーを使用することができるが、中でも CO_2 （炭酸ガス）レーザーを用いることが加工性の良さや制御性の点で好ましい。また、レーザー光による加工の被処理幅（線幅）は例えば $0.2 \text{ mm} \sim 1.0 \text{ mm}$ の範囲に設定すると良い。

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【0021】

上述のようにして得られる空気入りタイヤは、タイヤ表面に配置されたフィルム層11～13と下地ゴム層14とを含む積層体10を備え、フィルム層11～13を熱可塑性樹脂又は熱可塑性エラストマー組成物から構成すると共に、フィルム層11～13を互いに

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異なる色であって下地ゴム層 1 4 とは異なる色に着色し、フィルム層 1 1 ～ 1 3 にレーザー加工による深さが異なる複数の開口部 1 5 を形成し、これら深さが異なる開口部 1 5 を介して最外側のフィルム層 1 1 とは色が異なる 2 層以上のフィルム層 1 2, 1 3 を露出させているので、開口部 1 5 の形状又は配置に基づいて色彩に富んだ表示物を形成することが可能である。しかも、開口部 1 5 の形状又は配置に基づいて形成された表示物は、インクジェット方式等の印刷により形成された表示物とは異なって、日差しや風雨に晒される空気入りタイヤにおいても剥がれ落ちを生じ難いので、その表示物を長期間にわたって表示することができる。

【0022】

上記空気入りタイヤにおいて、積層体 1 0 は互いに異なる色に着色された 3 層以上 1 0 層以下のフィルム層を含むことが望ましい。この場合、3 色～10 色の組み合わせに基づいて鮮やかな表示物を形成することができる。特に、積層体 1 0 に含まれるフィルム層の色がカラーパレットにおいて均等に離れた 3 色を含むと良い。ここで、カラーパレットにおいて均等に離れた 3 色とは、好ましくは互いに 120° 離れた 3 色であるが、互いに 110°～130° 離れた 3 色であれば良い。このような 3 色としては、例えば、Y（イエロー）、M（マゼンタ）、C（シアン）の組み合わせ、或いは、R（レッド）、G（グリーン）、B（ブルー）の組み合わせを採用することができる。この場合、開口部 1 5 を有する積層体 1 0 はカラーパレットにおいて均等に離れた 3 色の組み合わせに基づいて描画されたカラー表示物を表示することが可能となる。

【0023】

なお、図 4 に示すように、積層体 1 0 をタイヤ表面に配置された 2 層のフィルム層 1 1, 1 2 と該フィルム層 1 1, 1 2 の下側に配置された下地ゴム層 1 4 とから構成することも可能である。フィルム層 1 1, 1 2 は互いに異なる色であって、かつ下地ゴム層 1 4 とは異なる色に着色されている。そして、フィルム層 1 1, 1 2 にはレーザー加工による深さが異なる複数の開口部 1 5 を形成され、これら深さが異なる開口部 1 5 を介して最外側のフィルム層 1 1 とは色が異なるフィルム層 1 2 及び下地ゴム層 1 4 が露出している。より具体的には、開口部 1 5 はフィルム層 1 1 を貫通する開口部 1 5 a とフィルム層 1 1, 1 2 を貫通する開口部 1 5 b とを含み、開口部 1 5 a を介してフィルム層 1 2 が露出する一方で開口部 1 5 b を介して下地ゴム層 1 4 が露出している。

【0024】

図 4 の積層構造を採用した場合においても、図 2 の積層構造と同様に、開口部 1 5 の形状又は配置に基づいて色彩に富んだ表示物を形成することができ、表示物を長期間にわたって表示することができる。但し、開口部 1 5 を介して下地ゴム層 1 4 を露出させたときに現れる色は、下地ゴム層 1 4 が持つ色（即ち、黒色）に限定されることになる。

【0025】

上記空気入りタイヤにおいて、積層体 1 0 はサイドウォール部 2 の外壁に配置されている。この場合、鮮やかな色彩を有する表示物をタイヤデザインの一部として有効に活用することができる。なお、デザイン上の効果は限定されるが、上述した積層体 1 0 をタイヤ内壁に配置し、その積層体 1 0 に対して所望の開口部 1 5 を形成することも可能である。

【0026】

図 5 は開口部により描写されるカラー表示物を例示するものである。図 5 において、カラー表示物 1 6 はドット形状を有する多数の開口部 1 5 から構成され、これら開口部 1 5 を介して 3 色（Y, M, C）のいずれか 1 つを表示するようになっている。例えば、ストライプ状に区分された複数の領域 R 1 ～R 7 において 3 色（Y, M, C）の配置割合を徐々に異ならせることにより、虹色の帯を描写することが可能である。勿論、虹色の帯は簡単な例であり、開口部 1 5 をより小さくし、その配置密度を高めた場合、写真のようなカラー表示物 1 6 を形成することも可能である。

【0027】

図 6～図 8 はそれぞれ開口部により描写される情報表示物を例示するものである。これら図 6～図 8 に示すように、開口部 1 5 は文字、図形、記号又は数字からなる情報表示要

素 17 を形成することができる。そして、開口部 15 は会社のロゴマーク、タイヤのブランド、バーコード、タイヤサイズ、製造情報、使用条件又は使用上の注意事項からなる情報表示物 18 を構成することができる。これら情報表示物 18 を開口部 15 に基づいて表示するにあたって、その情報表示物 18 をカラー表示としたり、或いは、文字や絵柄毎に色を変えることが可能である。

【0028】

以下、本発明においてフィルム層に使用される熱可塑性樹脂又は熱可塑性樹脂とエラストマーとをブレンドした熱可塑性エラストマー組成物について説明する。

【0029】

本発明で使用される熱可塑性樹脂としては、例えば、ポリアミド系樹脂〔例えば、ナイロン 6 (N6)、ナイロン 66 (N66)、ナイロン 46 (N46)、ナイロン 11 (N11)、ナイロン 12 (N12)、ナイロン 610 (N610)、ナイロン 612 (N612)、ナイロン 6/66 共重合体 (N6/66)、ナイロン 6/66/610 共重合体 (N6/66/610)、ナイロン MXD6 (MXD6)、ナイロン 6T、ナイロン 6/6T 共重合体、ナイロン 66/PP 共重合体、ナイロン 66/PPS 共重合体〕及びそれらの N-アルコキシアルキル化物〔例えば、ナイロン 6 のメトキシメチル化物、ナイロン 6/610 共重合体のメトキシメチル化物、ナイロン 612 のメトキシメチル化物〕、ポリエステル系樹脂〔例えば、ポリブチレンテレフタレート (PBT)、ポリエチレンテレフタレート (PET)、ポリエチレンイソフタレート (PEI)、PET/PEI 共重合体、ポリアリレート (PAR)、ポリブチレンナフタレート (PBN)、液晶ポリエステル、ポリオキシアルキレンジイミドジ酸/ポリブチレンテレフタレート共重合体などの芳香族ポリエステル〕、ポリニトリル系樹脂〔例えば、ポリアクリロニトリル (PAN)、ポリメタクリロニトリル、アクリロニトリル/スチレン共重合体 (AS)、(メタ)アクリロニトリル/スチレン共重合体、(メタ)アクリロニトリル/スチレン/ブタジエン共重合体〕、ポリメタクリレート系樹脂〔例えば、ポリメタクリル酸メチル (PMMA)、ポリメタクリル酸エチル〕、ポリビニル系樹脂〔例えば、ポリ酢酸ビニル、ポリビニルアルコール (PVA)、ビニルアルコール/エチレン共重合体 (EVOH)、ポリ塩化ビニリデン (PVC)、塩化ビニル/塩化ビニリデン共重合体、塩化ビニリデン/メチルアクリレート共重合体、塩化ビニリデン/アクリロニトリル共重合体〕、セルロース系樹脂〔例えば、酢酸セルロース、酢酸酪酸セルロース〕、フッ素系樹脂〔例えば、ポリフッ化ビニリデン (PVDF)、ポリフッ化ビニル (PVF)、ポリクロロフルオロエチレン (PCTFE)、テトラフルオロエチレン/エチレン共重合体 (ETFE)〕、イミド系樹脂〔例えば、芳香族ポリイミド (PI)〕等を好ましく用いることができる。

【0030】

本発明で使用されるエラストマーとしては、例えば、ジエン系ゴム及びその水添物〔例えば、天然ゴム (NR)、イソプレンゴム (IR)、エポキシ化天然ゴム、スチレンブタジエンゴム (SBR)、ブタジエンゴム (BR、高シス BR 及び低シス BR)、ニトリルゴム (NBR)、水素化 NBR、水素化 SBR〕、オレフィン系ゴム〔例えば、エチレンプロピレンゴム (EPDM、EPM)、マレイン酸変性エチレンプロピレンゴム (M-EPM)、ブチルゴム (IIR)、イソブチレンと芳香族ビニル又はジエン系モノマー共重合体、アクリルゴム (ACM)、アイオノマー〕、含ハロゲンゴム〔例えば、Br-IIR、Cl-IIR、イソブチレンパラメチルスチレン共重合体の臭素化物 (Br-IPMS)、クロロブレンゴム (CR)、ヒドリノゴム (CHR)、クロロスルホン化ポリエチレンゴム (CSM)、塩素化ポリエチレンゴム (CM)、マレイン酸変性塩素化ポリエチレンゴム (M-CM)〕、シリコンゴム〔例えば、メチルビニルシリコンゴム、ジメチルシリコンゴム、メチルフェニルビニルシリコンゴム〕、含イオウゴム〔例えば、ポリスルフィドゴム〕、フッ素ゴム〔例えば、ビニリデンフルオリド系ゴム、含フッ素ビニルエーテル系ゴム、テトラフルオロエチレン-プロピレン系ゴム、含フッ素シリコン系ゴム、含フッ素ホスファゼン系ゴム〕、熱可塑性エラストマー〔例えば、スチレン系エラストマ

一、オレフィン系エラストマー、エステル系エラストマー、ウレタン系エラストマー、ポリアミド系エラストマー〕等を好ましく使用することができる。

【0031】

前記した特定の熱可塑性樹脂とエラストマーとの相溶性が異なる場合は、第3成分として適当な相溶化剤を用いて両者を相溶化させることができる。ブレンド系に相溶化剤を混合することにより、熱可塑性樹脂とエラストマーとの界面張力が低下し、その結果、分散相を形成しているゴム粒子径が微細になることから両成分の特性はより有効に発現されることになる。そのような相溶化剤としては、一般的に熱可塑性樹脂及びエラストマーの両方又は片方の構造を有する共重合体、或いは熱可塑性樹脂又はエラストマーと反応可能なエポキシ基、カルボニル基、ハロゲン基、アミノ基、オキサゾリン基、水酸基等を有した共重合体の構造をとるものとすることができる。これらは混合される熱可塑性樹脂とエラストマーの種類によって選定すればよいが、通常使用されるものには、スチレン／エチレン・ブチレンブロック共重合体（SEBS）及びそのマレイン酸変性物、EPDM、EPM、EPDM／スチレン又はEPDM／アクリロニトリルグラフト共重合体及びそのマレイン酸変性物、スチレン／マレイン酸共重合体、反応性フェノキシンを挙げるができる。かかる相溶化剤の配合量には特に限定はないが、好ましくは、ポリマー成分（熱可塑性樹脂とエラストマーとの合計）100重量部に対して、0.5～10重量部がよい。

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【0032】

熱可塑性エラストマー組成物において、特定の熱可塑性樹脂とエラストマーとの組成比は、特に限定されるものではなく、熱可塑性樹脂のマトリクス中にエラストマーが不連続相として分散した構造をとるよう適宜決めればよいが、好ましい範囲は重量比90／10～15／85である。

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【0033】

本発明において、熱可塑性樹脂および熱可塑性エラストマー組成物には、必要特性を損なわない範囲で前記した相溶化剤などの他のポリマーを混合することができる。他のポリマーを混合する目的は、熱可塑性樹脂とエラストマーとの相溶性を改良するため、材料の成型加工性をよくするため、耐熱性向上のため、コストダウンのため等があり、これに用いられる材料としては、例えば、ポリエチレン（PE）、ポリプロピレン（PP）、ポリスチレン（PS）、ABS、SBS、ポリカーボネート（PC）等を例示することができる。また、一般的にポリマー配合物に配合される充填剤（炭酸カルシウム、酸化チタン、アルミナ等）、カーボンブラック、ホワイトカーボン等の補強剤、軟化剤、可塑剤、加工助剤、顔料、染料、老化防止剤等を必要特性を損なわない限り任意に配合することもできる。

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【0034】

また、エラストマーは熱可塑性樹脂との混合の際、動的に加硫することもできる。動的に加硫する場合の加硫剤、加硫助剤、加硫条件（温度、時間）等は、添加するエラストマーの組成に応じて適宜決定すればよく、特に限定されるものではない。

【0035】

加硫剤としては、一般的なゴム加硫剤（架橋剤）を用いることができる。具体的には、イオウ系加硫剤としては粉末イオウ、沈降性イオウ、高分散性イオウ、表面処理イオウ、不溶性イオウ、ジモルフオリンジサルファイド、アルキルフェノールジサルファイド等を例示でき、例えば、0.5～4 phr〔本明細書において、「phr」は、エラストマー成分100重量部あたりの重量部をいう。以下、同じ。〕程度用いることができる。

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【0036】

また、有機過氧化物系の加硫剤としては、ベンゾイルパーオキシド、*t*-ブチルヒドロパーオキシド、2,4-ジクロロベンゾイルパーオキシド、2,5-ジメチル-2,5-ジ（*t*-ブチルパーオキシ）ヘキサン、2,5-ジメチルヘキサン-2,5-ジ（パーオキシルベンゾエート）等が例示され、例えば、1～20 phr程度用いることができる。

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【0037】

更に、フェノール樹脂系の加硫剤としては、アルキルフェノール樹脂の臭素化物や、塩化スズ、クロロブレン等のハロゲンドナーとアルキルフェノール樹脂とを含有する混合架橋系等が例示でき、例えば、1～20 phr 程度用いることができる。

【0038】

その他として、亜鉛華（5 phr 程度）、酸化マグネシウム（4 phr 程度）、リサーチ（10～20 phr 程度）、p-キノンジオキシム、p-ジベンゾイルキノンジオキシム、テトラクロロ-p-ベンゾキノ、ポリ-p-ジニトロソベンゼン（2～10 phr 程度）、メチレンジアニリン（0.2～10 phr 程度）が例示できる。

【0039】

また、必要に応じて、加硫促進剤を添加してもよい。加硫促進剤としては、アルデヒド・アンモニア系、グアニジン系、チアゾール系、スルフェンアミド系、チウラム系、ジチオ酸塩系、チオウレア系等の一般的な加硫促進剤を、例えば、0.5～2 phr 程度用いることができる。

【0040】

具体的には、アルデヒド・アンモニア系加硫促進剤としては、ヘキサメチレンテトラミン等、グアニジン系加硫促進剤としては、ジフェニルグアニジン等、チアゾール系加硫促進剤としては、ジベンゾチアジルジサルファイド（DM）、2-メルカプトベンゾチアゾール及びそのZn塩、シクロヘキシルアミン塩等、スルフェンアミド系加硫促進剤としては、シクロヘキシルベンゾチアジルスルフェンアミド（CBS）、N-オキシジエチレンベンゾチアジルー2-スルフェンアミド、N-tert-ブチル-2-ベンゾチアゾールスルフェンアミド、2-（チモルポリニルジチオ）ベンゾチアゾール等、チウラム系加硫促進剤としては、テトラメチルチウラムジサルファイド（TMTD）、テトラエチルチウラムジサルファイド、テトラメチルチウラムモノサルファイド（TMTM）、ジペンタメチレンチウラムテトラサルファイド等、ジチオ酸塩系加硫促進剤としては、Zn-ジメチルジチオカーバメート、Zn-ジエチルジチオカーバメート、Zn-ジーtert-ブチルジチオカーバメート、Zn-エチルフェニルジチオカーバメート、Te-ジエチルジチオカーバメート、Cu-ジメチルジチオカーバメート、Fe-ジメチルジチオカーバメート、ピベコリンピベコリルジチオカーバメート等、チオウレア系加硫促進剤としては、エチレンチオウレア、ジエチルチオウレア等を挙げることができる。

【0041】

また、加硫促進助剤としては、一般的なゴム用助剤を併せて用いることができ、例えば、亜鉛華（5 phr 程度）、ステアリン酸やオレイン酸及びこれらのZn塩（2～4 phr 程度）等が使用できる。

【0042】

熱可塑性エラストマー組成物の製造方法は、予め熱可塑性樹脂とエラストマー（ゴムの場合は未加硫物）とを2軸混練押出機等で熔融混練し、連続相（マトリックス）を形成する熱可塑性樹脂中に分散相（ドメイン）としてエラストマーを分散させることによる。エラストマーを加硫する場合には、混練下で加硫剤を添加し、エラストマーを動的加硫させてもよい。また、熱可塑性樹脂またはエラストマーへの各種配合剤（加硫剤を除く）は、上記混練中に添加してもよいが、混練の前に予め混合しておくことが好ましい。熱可塑性樹脂とエラストマーの混練に使用する混練機としては、特に限定はなく、スクリュエー押出機、ニーダ、パンバリミキサー、2軸混練押出機等が使用できる。中でも熱可塑性樹脂とエラストマーの混練およびエラストマーの動的加硫には、2軸混練押出機を使用するのが好ましい。更に、2種類以上の混練機を使用し、順次混練してもよい。熔融混練の条件として、温度は熱可塑性樹脂が溶融する温度以上であればよい。また、混練時の剪断速度は1000～7500 sec^{-1} であるのが好ましい。混練全体の時間は30秒から10分、また加硫剤を添加した場合には、添加後の加硫時間は15秒から5分であるのが好ましい。上記方法で製作されたポリマー組成物は、射出成形、押出し成形等、通常の熱可塑性樹脂の成形方法によって所望の形状にすればよい。

【0043】

このようにして得られる熱可塑性エラストマー組成物は、熱可塑性樹脂のマトリクス中にエラストマーが不連続相として分散した構造をとる。かかる構造をとることにより、フィルム層に十分な柔軟性と連続相としての樹脂層の効果により十分な剛性を併せ付与することができると共に、エラストマーの多少によらず、成形に際し、熱可塑性樹脂と同等の成形加工性を得ることができる。

【0044】

熱可塑性樹脂および熱可塑性エラストマー組成物の J I S K 7 1 0 0 により定められるところの標準雰囲気中におけるヤング率は、特に限定されるものではないが、好ましくは 1 ~ 5 0 0 M P a 、より好ましくは 5 0 ~ 5 0 0 M P a にするとよい。

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【0045】

上記熱可塑性樹脂又は熱可塑性エラストマー組成物はシート又はフィルムに成形して単体で用いることが可能であるが、隣接するゴムとの接着性を高めるために接着層を積層しても良い。この接着層を構成する接着用ポリマーの具体例としては、分子量 1 0 0 万以上、好ましくは 3 0 0 万以上の超高分子量ポリエチレン (U H M W P E) 、エチレンエチルアクリレート共重合体 (E E A) 、エチレンメチルアクリレート樹脂 (E M A) 、エチレンアクリル酸共重合体 (E A A) 等のアクリレート共重合体類及びそれらの無水マレイン酸付加物、ポリプロピレン (P P) 及びそのマレイン酸変性物、エチレンプロピレン共重合体及びそのマレイン酸変性物、ポリブタジエン系樹脂及びその無水マレイン酸変性物、スチレンーブタジエンーすチレン共重合体 (S B S) 、スチレンーエチレンーブタジエンーすチレン共重合体 (S E B S) 、フッ素系熱可塑性樹脂、ポリエステル系熱可塑性樹脂などを挙げることができる。これらは常法に従って例えば樹脂用押出機によって押し出してシート状又はフィルム状に成形することができる。接着層の厚さは特に限定されないが、タイヤ軽量化のためには厚さが少ない方がよく、5 μ m ~ 1 5 0 μ m が好ましい。

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【実施例】

【0046】

タイヤサイズが 2 3 5 / 4 0 R 1 8 9 1 W であり、サイドウォール部の外壁に、タイヤ表面に配置された 3 層のフィルム層と該フィルム層の下側に配置された下地ゴム層とを含む積層体を設け、これらフィルム層を熱可塑性樹脂とエラストマーとをブレンドした熱可塑性エラストマー組成物から構成すると共に、各フィルム層を黒色の下地ゴム層とは異なる色 (赤、青、緑) に着色した空気入りタイヤを加硫した後、図 2 に示すように、フィルム層にレーザー加工により深さが異なる複数の開口部を形成し、これら深さが異なる開口部を介して最外側のフィルム層とは色が異なる 2 層のフィルム層を露出させることにより、開口部を有する積層体が 3 色の組み合わせに基づいて描画されたカラー表示物を表示するようにした実施例 1 のタイヤを作製した。

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【0047】

フィルム層を構成する熱可塑性エラストマー組成物としては、表 1 に示す配合を有する基礎材料を用意し、これに適量の顔料を添加することで赤色、青色又は緑色とした。また、各フィルム層の厚さは約 6 0 μ m とした。一方、下地ゴム層となるタイゴム層としては、表 2 に示す配合を有するゴム組成物を用いた。

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【0048】

【表 1】

	質量部
BIMS ^{a)}	10●
酸化亜鉛	0.5
ステアリン酸	0.2
ステアリン酸亜鉛	1
N6/66	100
変性EEA ^{b)}	10

備考：a) 臭素化イソブチレン-p-メチルスチレン共重合体

b) 無水マレイン酸変性エチレン-エチルアクリレート共重合体

【0049】

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【表 2】

	質量部
スチレンブタジエンゴム	日本ゼオン株式会社製 「Nipol 1502」
天然ゴム	SIR-20
カーボンブラック	東海カーボン株式会社製 「シーストV」
ステアリン酸	工業用ステアリン酸
アロマオイル	昭和シェル石油株式会社製 「デソレックス3号」
酸化亜鉛	正岡化学工業株式会社製 「重鉛華3号」
変性レゾルシン・ホルムアルデ ヒド縮合体	田岡化学工業株式会社製 「スミカノール620」
メチレンドナー	変性エーテル化メチロールメラミン 田岡化学工業株式会社製 「スミカノール507AP」
硫黄	5%油展処理硫黄
加硫促進剤	ジー2ーベンゾチアゾリルスルフィド 大内新興化学工業株式会社製 「ノクセラーDM」

【0050】

上述した実施例1のタイヤについて、開口部を有する積層体に表示されたカラー表示物を確認したところ、そのカラー表示物は鮮やかな色彩を有するものであった。また、実施例1のタイヤにおいて開口部の形状又は配置に基づいて形成されたカラー表示物は、インクジェット方式等の印刷により形成された表示物とは異なって、日差しや風雨に晒される空気入りタイヤにおいても剥がれ落ちを生じ難く、長期間にわたって表示することが可能である。

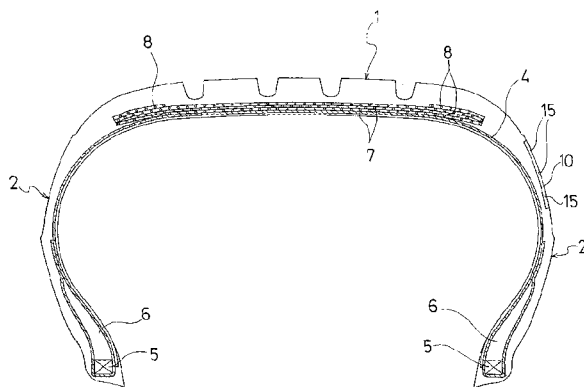
【符号の説明】

【0051】

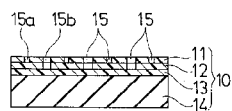
- 1 トレッド部
- 2 サイドウォール部
- 3 ビード部
- 10 積層体
- 11, 12, 13 フィルム層
- 14 下地ゴム層

- 1 5 開口部
- 1 6 カラー表示物
- 1 7 情報表示要素
- 1 8 情報表示物

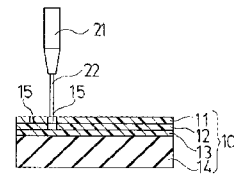
【図 1】



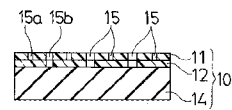
【図 2】



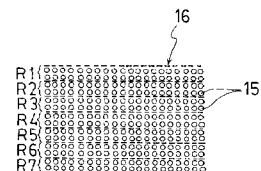
【図 3】



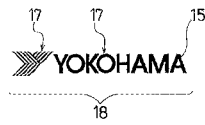
【図 4】



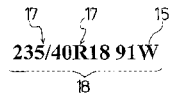
【図 5】



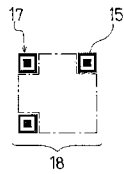
【 図 6 】



【 図 7 】



【 図 8 】



フロントページの続き

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Fターム(参考) 4F212 AH20 VA04 VD09 VL22

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 Document Display

< 1 of 1 Display >

JP,2014-213718,A

Registration gazette

 Entire PDF Document Details OPD Search key URL Mistranslation

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Bibliography

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(19) [Publication country/region] JP
(12) [Kind of official gazette] A
(11) [Publication number] 2014213718
(43) [Date of publication of application] 20141117
(54) [Title of the invention] PNEUMATIC TIRE AND PNEUMATIC TIRE MANUFACTURING METHOD
(51) [International Patent Classification]
B60C 13/00 (2006.01)
B60C 13/04 (2006.01)
B29D 30/72 (2006.01)
[FI]
B60C 13/00 E
B60C 13/04 Z
B60C 13/00 C
B29D 30/72
(21) [Application number] 2013092476
(22) [Filing date] 20130425
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[Theme code (reference)]
4F212
[F-term (reference)]
4F212AH20
4F212VA04
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4F212VL22



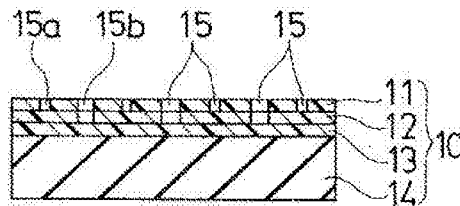
Overview

Close

(57) [Overview]

PROBLEM TO BE SOLVED: To provide a pneumatic tire and a pneumatic tire manufacturing method capable of forming a colorful display article and holding the display article for a long period of time.

SOLUTION: A pneumatic tire comprises a laminate 10 including a plurality of film layers 11 to 13 arranged on a tire surface and a base rubber layer 14 arranged under the film layers 11 to 13. The film layers 11 to 13 comprise a thermoplastic resin or a thermoplastic elastomer composition that is a mixture of the thermoplastic resin and the elastomer, the film layers 11 to 13 are colored differently from one another and from the base rubber layer 14, and a plurality of openings 15 having different depths is formed in the film layers 11 to 13 by laser processing. The two or more film layers 12, 13 colored differently from the outermost film layer 11 are exposed via these openings 15 having the different depths.



Scope of Claims

Close

[Patent Claims]

[Claim 1]

A thermoplastic elastomer composition comprises a laminate comprising a plurality of layers of film disposed on a surface of a tire and a layer of an underlying rubber disposed on a lower side of the layer, wherein the film layer is composed of a thermoplastic elastomer composition comprising a thermoplastic resin or a thermoplastic resin and an elastomer. The pneumatic tire is characterized in that the film layer is colored in color different from that of the base rubber layer, and a plurality of openings having different depths are formed in the film layer by laser processing, and 2 or more layers having different colors from the outermost film layer are exposed through openings having different depths.

[Claim 2]

The pneumatic tire according to claim 1, wherein the laminate includes 3 or more and 10 or less film layers colored in different colors.

[Claim 3]

The pneumatic tire of claim 2, wherein the color of the film layer includes 3 colors spaced evenly apart in a color pallet.

[Claim 4]

The pneumatic tire according to claim 3, wherein the laminate having the opening portion displays a color display object drawn on the basis of a combination of 3 colors evenly spaced in the color palette.

[Claim 5]

A pneumatic tire according to any of claims 1 to 4, wherein the opening forms an information display element consisting of letters, figures, symbols or numbers.

[Claim 6]

A pneumatic tire according to any of claims 1 to 5, characterized in that said opening constitutes an information display consisting of a company's logo of a company, a brand of a tire, a bar code, a tire size, a manufacturing information, a use condition



on or a use care.

[Claim 7]

The pneumatic tire according to any one of claims 1 to 6, wherein the laminate is disposed on an outer wall of a sidewall portion.

[Claim 8]

A thermoplastic elastomer composition comprises a laminate comprising a plurality of layers of film disposed on a surface of a tire and a layer of an underlying rubber disposed on a lower side of the layer, wherein the film layer is composed of a thermoplastic elastomer composition comprising a thermoplastic resin or a thermoplastic resin and an elastomer. A pneumatic tire, which is colored in a color different from that of the underlying rubber layer, is vulcanized. A method for manufacturing a pneumatic tire, wherein a plurality of openings having different depths are formed on the film layer by laser processing, and 2 or more layers having different colors from the outermost film layer are exposed through openings having different depths.

[Claim 9]

The method of manufacturing a pneumatic tire according to claim 8, wherein the laminate includes 3 or more and 10 or less film layers colored in different colors.

[Claim 10]

The method of manufacturing a pneumatic tire according to claim 9, wherein the color of the film layer includes 3 colors uniformly spaced in the color pallet.

[Claim 11]

The method of manufacturing a pneumatic tire according to claim 10, wherein the laminate having the opening portion displays a color display object drawn on the basis of a combination of 3 colors equally spaced in the color palette.

[Claim 12]

A method of manufacturing a pneumatic tire according to any one of claims 8 to 11, wherein the opening portion forms an information display element consisting of letters, figures, symbols or numerals.

[Claim 13]

A method of manufacturing a pneumatic tire according to any one of claims 8 to 12, wherein said opening part constitutes an information display part comprising a logo mark of a company, a brand of a tire, a bar code, a tire size, a manufacturing information, a use condition, or an attention of use.

[Claim 14]

A method of manufacturing a pneumatic tire according to any one of claims 8 to 13, wherein the laminate is disposed on an outer wall of a sidewall portion.

Detailed Description

Close

[Detailed description of the invention]

[Technical field]

[0001]

The present invention relates to a pneumatic tire with an arbitrary display object and a method of manufacturing the same, and more particularly to a pneumatic tire and a method of manufacturing the same in which a display object rich in color can be formed and which can be held for a long period of time.

[Background of the Invention]

[0002]

In the pneumatic tire, carbon black is blended as a reinforcing material into the rubber composition constituting the pneumatic tire, and thus the tire is entirely black. Therefore, it is technically difficult to express a pneumatic tire in a vivid color.

[0003]

On the other hand, it has been proposed that a display object such as a character or a pattern is drawn on a side surface of a tire by printing such as an ink jet method (see, for example, Patent Document 1). However, when a display object is provided on a side surface of a tire by printing, such as an ink jet method, there is a problem in that, in a pneumatic tire exposed to sunshine and / or wind, the ink tends to be peeled off, so that it is difficult to display the display object over a long period of time.

[Prior art reference]

[Patent document]



[0004]

[Patent document 1]JP 2012-131508A

[Summary of the invention]

[Problem to be solved by the invention]

[0005]

It is an object of the present invention to provide a pneumatic tire and a method for manufacturing the same, which can form a display material rich in color and can hold the display material for a long period of time.

[Means for solving the problem]

[0006]

A pneumatic tire according to the present invention for achieving the above object comprises a laminate including a plurality of film layers disposed on a surface of a tire and a base rubber layer disposed below the film layer, wherein the film layer is composed of a thermoplastic resin or a thermoplastic elastomer composition obtained by blending a thermoplastic resin and an elastomer. The film layer is colored in color different from the color of the base rubber layer, and a plurality of openings having different depths are formed in the film layer by laser processing, and 2 or more layers different in color from the outermost film layer are exposed through openings having different depths.

[0007]

The manufacturing method of the pneumatic tire of the present invention for achieving the above-mentioned object comprises the laminated body containing the film layer of two or more layers arranged in a tire surface, and the ground rubber layer arranged below the film layer,

A thermoplastic elastomer composition comprising a thermoplastic resin or a thermoplastic resin and an elastomer is used as the film layer.

A plurality of openings having different depths are formed by laser processing on the film layer after vulcanizing a pneumatic tire in which the film layers are colored differently than the base rubber layer of different color from each other, and these depths are different.

A layer of 2 or more layers different in color from an outermost film layer is exposed through an opening.

[Effect of the Invention]

[0008]

In the present invention, a pneumatic tire comprises a laminate including a plurality of film layers and a base rubber layer, wherein the film layer is composed of a thermoplastic resin or a thermoplastic elastomer composition, and the film layers are colored differently from the base rubber layer of different colors. By forming a plurality of openings having different depths by laser processing on a film layer and exposing 2 or more layers having different color from the outermost film layer through openings having different depths, a display material rich in color can be formed based on the shape or arrangement of the openings. Further, unlike a display object formed based on a shape or the like of an opening, a display object formed on the basis of the shape or the arrangement of an opening is not easily peeled off even in a pneumatic tire exposed to a sunshine or a wind and rain, so that the display object can be displayed over a long period of time.

[0009]

In the present invention, it is preferable that the laminate includes 3 or more and 10 or less film layers colored in different colors. Thus, a more vivid display object can be formed. In particular, it is preferred that the color of the film layer includes 3 colors spaced evenly apart in the color palette. Preferably, the laminate having an opening portion displays a color display object drawn on the basis of a combination of 3 colors equally spaced in the color palette.

[0010]

The opening may form an information display element comprising letters, figures, symbols or numbers. The opening may then comprise an information display comprising a company logo, a brand of a tire, a bar code, a tire size, a manufacturing information, a usage condition, or a use condition. Also, it is possible to realize a vivid display of these information display elements or information display objects.

[0011]

Preferably, the laminate is disposed on an outer wall of the sidewall portion. In this case, an object having a vivid color can be effectively utilized as a part of a tire design.

[Brief Description of the Drawings]

[0012]

[Fig. 1]FIG. 1 is a meridian sectional view showing a pneumatic tire according to an embodiment of the present invention ;.

[Fig. 2]FIG. 3 is a cross-sectional view showing a laminate comprising a film layer and a base rubber layer in the pneumatic tire of FIG. 1 ;.

[Fig. 3]FIG. 4 is a cross-sectional view showing a step of forming an opening in a film layer ;.



[Fig. 4]FIG. 4 is a cross-sectional view showing a modification of a laminate comprising a film layer and a base rubber layer ;.

[Fig. 5]FIG. 4 is a plan view illustrating an example of a color display depicted by an opening ;.

[Fig. 6]FIG. 4 is a plan view illustrating an example of an information display depicted by an opening ;.

[Fig. 7]FIG. 4 is a plan view illustrating another example of an information display depicted by an opening ;.

[Fig. 8]FIG. 4 is a plan view illustrating another example of an information display depicted by an opening ;.

[Mode for carrying out the invention]

[0013]

Hereinafter, it describes in detail, referring to attached Drawings for a constituent of the present invention. FIGS. 1 to 3 show a pneumatic tire according to an embodiment of the present invention. As shown in FIG. 1, the pneumatic tire of the present embodiment includes a tread portion 1 extending in the tire circumferential direction and forming an annular shape, a pair of sidewall portions 2 disposed on both sides of the tread portion 1, and a pair of bead portions 3,3 disposed on the inner side in the tire radial direction of the sidewall portions 2,2.

[0014]

A carcass layer 4 is mounted between a pair of bead portions 3,3. The carcass layer 4 includes a plurality of reinforcing cords extending in the tire radial direction, and is folded from the inside of the tire toward the outside of the bead core 5 disposed on each bead portion 3. A bead filler 6 made of a rubber composition having a triangular cross section is disposed on an outer periphery of the bead core 5.

[0015]

On the other hand, a plurality of belt layers 7 are embedded in the outer circumferential side of the carcass layer 4 in the tread portion 1. The belt layers 7 include a plurality of reinforcing cords inclined with respect to the tire circumferential direction, and are arranged so that the reinforcing cords cross each other between the layers. In the belt layer 7, an inclination angle of the reinforcing cord with respect to the tire circumferential direction is set in a range of, for example, 10 ° to 40 °. As the reinforcing cord of the belt layer 7, a steel cord is preferably used. On the outer peripheral side of the belt layer 7, at least 1 belt cover layers 8 are arranged at an angle of, for example, 5 ° or less with respect to the tire circumferential direction for the purpose of improving high-speed durability. As the reinforcing cord of the belt cover layer 8, an organic fiber cord such as a nylon or aramid is preferably used. Further, an inner liner layer 9 is disposed on the inner wall of the tire along the carcass layer 4.

[0016]

Note that, although the above-described tire reinforcing structure shows a typical example of a pneumatic tire, the present invention is not limited thereto.

[0017]

In the pneumatic tire, as shown in FIG. 2, a laminate 10 including a 3 layer film layer 11,12,13 disposed on a tire surface and a base rubber layer 14 disposed below the film layers 11 to 13 is added to an outer wall of the sidewall portion 2. The base rubber layer 14 is a tie rubber layer interposed between the rubber layer adjacent to the laminate 10 and the film layers 11 to 13.

[0018]

Each of the above-described film layers 11 to 13 is composed of a thermoplastic resin or a thermoplastic elastomer composition obtained by blending a thermoplastic resin and an elastomer. Although the thickness of the film layers 11 to 13 is not particularly limited, for example, it is desirable to set the thickness of the film layers to a range of 10μm-100μm. The film layers 11 to 13 have different colors and are colored differently than the base rubber layer 14. Then, a plurality of openings 15 having different depths are formed in the film layers 11 to 13, and a film layer 12,13 of 2 layers different in color from the outermost film layer 11 is exposed through the openings 15 having different depths. More specifically, the opening 15 includes an opening 15 a through the film layer 11 and an opening 15 b through the film layer 11,12, and the film layer 13 is exposed through the opening 15 a while the film layer 12 is exposed through the opening 15 b.

[0019]

In manufacturing such a pneumatic tire, first, a pneumatic tire including a laminate 10 including * layers 11 to 13 and a base rubber layer 14 is vulcanized as described above. Thereafter, as shown in FIG. 3, a laser beam 22 is irradiated from the processing head 21 of the laser irradiation apparatus to the film layers 11 to 13, and the irradiated portion is removed. A plurality of openings 15 having different depths are formed in film layers 11 to 13, and a film layer 12,13 of 2 layers different in color from the outermost film layer 11 is exposed through these openings 15.

[0020]

Irradiation of the laser beam 22 may be performed continuously while moving the processing head 21, or may be intermittently performed while moving the processing head 21. By adjusting the moving speed of the processing head 21 and the intensity



nsity of the laser beam 22, it is possible to appropriately adjust the depth of the opening 15 to be formed. As a laser, for example, an infrared laser, a CO₂ (carbon dioxide gas) laser, or a YAG laser can be used, and among them, a CO₂ (carbon dioxide gas) laser is preferably used in view of good processability and controllability. In addition, it is preferable to set the width (line width) of the laser beam to be processed within a range of, for example, a 0.2mm-1.0mm.

[0021]

The pneumatic tire obtained as described above comprises a laminate 10 including a film layer 11 to 13 disposed on a surface of a tire and a base rubber layer 14, wherein the film layers 11 to 13 are formed of a thermoplastic resin or a thermoplastic elastomer composition, and the film layers 11 to 13 are each formed of a thermoplastic resin or a thermoplastic elastomer composition.

A plurality of openings 15 having different colors and different colors from the base rubber layer 14 and different in depth from the film layers 11 to 13 by laser processing are formed. Since the film layer 12, 13 of 2 or more layers different in color from the outermost film layer 11 is exposed through the openings 15 having different depths, a display material rich in color can be formed based on the shape or the arrangement of the opening 15. Further, unlike a display object formed by printing of an ink jet method or the like, a display object formed on the basis of the shape or arrangement of the opening portions 15 is not easily peeled off even in a pneumatic tire exposed to sunshine and wind and rain, so that the display object can be displayed over a long period of time.

[0022]

In the pneumatic tire, it is desirable that the laminate 10 includes a film layer of 3 or more layers and a film layer of 10 or less layers colored in different colors. In this case, a vivid display object can be formed on the basis of a combination of 3 to 10 colors. In particular, it is preferable that the color of the film layer included in the laminate 10 includes 3 colors equally spaced in the color palette. Here, 3 colors equally spaced from each other in the color palette are preferably 3 colors spaced apart from each other by 120°, but may be 3 colors separated from each other by 110° to 130°. As such 3 colors, a combination of Y (yellow), M (magenta), and C (cyan) or a combination of R (red), G (green), and B (blue) can be adopted, for example. In this case, the laminate 10 having the opening 15 can display a color display object drawn on the basis of a combination of 3 colors equally spaced in the color palette.

[0023]

As shown in FIG. 4, it is also possible for the laminate 10 to be composed of a 2 layer film layer 11, 12 disposed on the tire surface and a base rubber layer 14 disposed below the film layer 11, 12. The film layers 11, 12 have different colors and are colored differently than the base rubber layer 14. In addition, a plurality of openings 15 having different depths are formed on the film layer 11, 12, and a film layer 12 and a base rubber layer 14 having different colors from the outermost film layer 11 are exposed through openings 15 having different depths. More specifically, the opening 15 includes an opening 15 a extending through the film layer 11 and an opening 15 b extending through the film layer 11, 12, and the film layer 12 is exposed through the opening 15 a, and the base rubber layer 14 is exposed through the opening 15 b.

[0024]

Even when the laminated structure of FIG. 4 is employed, similarly to the laminated structure of FIG. 2, a display material rich in color can be formed on the basis of the shape or arrangement of the opening 15, and display objects can be displayed over a long period of time. However, a color appearing when the base rubber layer 14 is exposed through the opening 15 is limited to a color (i.e., black) of the base rubber layer 14.

[0025]

In the pneumatic tire, the laminate 10 is disposed on an outer wall of the sidewall portion 2. In this case, an object having a vivid color can be effectively utilized as a part of a tire design. Although the effect on the design is limited, it is also possible to dispose the laminate 10 on the inner wall of the tire and to form a desired opening 15 on the laminate 10.

[0026]

FIG. 5 illustrates a color display depicted by an opening. In FIG. 5, a color display object 16 is composed of a plurality of openings 15 having a dot shape, and one of 3 colors (Y, M, and C) is displayed through these openings 15. For example, by gradually varying the arrangement ratio of 3 colors (Y, M, and C) in the plurality of regions R 1 to R 7 divided into stripes, it is possible to depict a rainbow color band. Of course, the iridescent band is a simple example, and if the opening 15 is made smaller and its arrangement density is increased, it is possible to form a color display 16 such as a photograph.

[0027]

FIGS. 6 to 8 illustrate an information display represented by an opening, respectively. As shown in FIG. 6 to FIG. 8, the opening portion 15 is formed of a letter, a figure, a symbol or a numeral.

Element 17 may be formed. The opening 15 may then comprise an information display 18 comprising a company logo mark, a tire brand, a bar code, a tire size, a manufacturing information, a usage condition, or a use consideration. When displaying



the information display object 18 on the basis of the opening 15, it is possible to display the information display object 18 in color or change the color of each of the characters and the pattern.

[0028]

Hereinafter, a thermoplastic elastomer composition which is used for a film layer and a thermoplastic elastomer composition which is obtained by blending a thermoplastic resin and an elastomer will be described.

[0029]

As a thermoplastic resin used in the present invention, for example, polyamide resin [e.g. nylon 6 (N6), nylon 66 (N66), nylon 46 (N46), nylon 11 (N11), nylon 12 (N12), nylon 610 (N610), nylon 612 (N612), Nylon 6/66 copolymer (N6/66), Nylon 6/66/610 copolymer (N6/66/610), Nylon MXD 6 (MXD6), and Nylon MXD (MXD)/Nylon 6 t, nylon 6/6 t copolymer, nylon 66/PP copolymer, nylon 66/PPS copolymer, and N-alkoxyalkyl thereof [e.g. A methoxymethylated product of nylon 6, a methoxymethylated product of nylon 6/610 copolymer, a methoxymethylated product of nylon 612, a polyester resin (e.g., polybutylene terephthalate (PBT), polyethylene terephthalate (PET), and a polyethylene terephthalate (PET)); Aromatic polyesters such as polyethylene isophthalate (PEI), PET/PEI copolymer, polyarylate (PAR), polybutylene naphthalate (PBN), liquid crystal polyester, polyoxyalkylene diimide diacid/polybutylene terephthalate copolymer, and the like. Poly nitrile system resin -- [-- for example, polyacrylonitrile (PAN) and a polymethacrylonitrile -- acrylonitrile/styrene copolymer (AS), acrylonitrile (meta-)/styrene copolymer, acrylonitrile (meta-)/styrene/butadiene copolymer], and polymethacrylate system resin -- [-- for example Polymethyl methacrylate (PMMA), polyethyl methacrylate, polyvinyl resin (e.g., polyvinyl acetate, polyvinyl alcohol (PVA), vinyl alcohol/ethylene copolymer (EVOH), polyvinylidene chloride (PVDC), polyvinyl chloride (PVC), vinyl chloride/vinylidene chloride copolymer, and the like). Vinylidene chloride/methyl acrylate copolymer, vinylidene chloride/acrylonitrile copolymer, cellulosic resin [e.g., cellulose acetate, cellulose acetate butyrate], fluorine-based resin [e.g., polyvinylidene fluoride (PVDF)] Polyvinyl fluoride (PVF), polychlorofluoroethylene (PCTFE), tetrafluoroethylene/ethylene copolymer (ETFE), and imide resin (e.g., aromatic polyimide (PI)) can be preferably used.

[0030]

As the elastomer used in the present invention, for example, a diene rubber and a hydrogenated product thereof [e.g., natural rubber (NR), isoprene rubber (IR), epoxidized natural rubber, etc.] can be used.

Styrene butadiene rubber (SBR), butadiene rubber (BR, high cis BR and low cis BR), nitrile rubber (NBR), hydrogenated NBR, hydrogenated SBR, olefinic rubber (e.g., ethylene propylene rubber (EPDM, EPM), maleic acid-modified ethylene propylene rubber (M-EPM), and the like).

Butyl rubber (IIR), isobutylene and aromatic vinyl or diene monomer copolymer, acrylic rubber (ACM), ionomer, and halogen-containing rubber [e.g., brominated (Br-IIR) of Br-IIR, CI-IIR, and isobutylene paramethylstyrene copolymer]; Chloroprene rubber (CR), hydri rubber (CHR), chlorosulfonated polyethylene rubber (CSM), chlorinated polyethylene rubber (CM), maleic acid-modified chlorinated polyethylene rubber (M-CM), and silicone rubber (e.g., a silicone rubber); Methylvinylsilicone rubber, dimethylsilicone rubber, [*****], sulfur-containing rubber (e.g., polysulfide rubber), and fluororubber [e.g.

Vinylidene fluoride rubber, fluorine-containing vinyl Ether rubber, tetrafluoroethylene-propylene rubber, fluorine-containing silicone rubber, fluorine-containing phosphazene rubber, and thermoplastic elastomers (e.g., styrene elastomers)

An olefin-based elastomer, an ester-based elastomer, a urethane-based elastomer, a polyamide-based elastomer, and the like can be preferably used.

[0031]

When the compatibility of the specific thermoplastic resin with the elastomer is different, a suitable compatibilizer may be used as the 3 component to compatibilize them. By mixing the compatibilizer into the blend system, the interfacial tension between the thermoplastic resin and the elastomer decreases, and as a result, the diameter of the rubber particle forming the dispersed phase becomes finer, so that the characteristics of both components can be more effectively expressed. As such a compatibilizer, a copolymer having a structure of both or one of a thermoplastic resin and an elastomer, or a copolymer having an epoxy group, a carbonyl group, a halogen group, an amino group, an oxazoline group, a hydroxyl group, and the like capable of reacting with a thermoplastic resin or an elastomer can be used. It may be selected according to the type of thermoplastic resin and elastomer to be mixed, and commonly used is styrene/ethylene/butylene block copolymer (SEBS) and maleic acid modified product thereof. Mention may be made of EPDM, EPM, EPDM/styrene or EPDM/acrylonitrile-grafted copolymers and their maleic acid-modified, styrene/maleic acid copolymers, reactive phenoxy and the like. The amount of such compatibilizer is not particularly limited, but is preferably from 0.5 to 10 parts by weight per 100 parts by weight of the polymer component (total of thermoplastic resin and elastomer).

[0032]

In the thermoplastic elastomer composition, a composition ratio of a specific thermoplastic resin to an elastomer is not particularly limited, and may be appropriately determined so as to have a structure in which an elastomer is dispersed as a dis-



tinuous phase in a matrix of a thermoplastic resin, and a preferable range is a weight ratio 90/10-15/85.

[0033]

In the present invention, the thermoplastic resin and the thermoplastic elastomer composition may be mixed with another polymer such as a compatibilizer described above within a range that does not impair necessary characteristics. The purpose of mixing other polymers is to improve the compatibility of the thermoplastic resin with the elastomer, to improve the processability of the material, to improve heat resistance, to reduce cost, and the like, and to provide a material used therefor. Examples thereof include polyethylene (PE), polypropylene (PP), polystyrene (PS), ABS, SBS, polycarbonate (PC), and the like. In general, a filler (e.g., calcium carbonate, Titanium Oxide, alumina, etc.), a reinforcing agent such as carbon black, white carbon, etc., a softening agent, a plasticizing agent, a processing aid, a pigment, a dye, an anti-aging agent, and the like may be optionally blended so long as the necessary characteristics are not impaired.

[0034]

Also, elastomers can be dynamically vulcanized upon mixing with thermoplastic resins. The vulcanizing agent, the vulcanizing aid, the vulcanizing condition (temperature, time) and the like in the case of dynamically vulcanizing may be appropriately determined depending on the composition of the elastomer to be added, and are not particularly limited.

[0035]

As the vulcanizing agent, a general rubber vulcanizing agent (crosslinking agent) can be used. Specifically, as the sulfur-based vulcanizing agent, powdered sulfur, precipitated sulfur, highly dispersible sulfur, and highly dispersible sulfur are used. Being able to illustrate [for example,] surface treatment sulfur, insoluble sulfur, ***** phosphorus disulfide, alkylphenol disulfide, etc., a 0.5 - 4phr[in the specification and "phr" say the weight section per 100 parts by weight of elastomer components. In the following description, the same reference numerals will be used.

[0036]

Also, as the organic peroxide based vulcanizing agent, benzoyl peroxide is used. Examples thereof include t-butyl hydroperoxide, 2,4 - dichlorobenzoyl peroxide, 2,5-dimethyl-2,5-di(t-butylperoxy)hexanoic, 2,5 - dimethylhexane - 2,5 - di (peroxybenzoate), and the like, and for example, about 1 to 20 phr can be used.

[0037]

Further, examples of the phenol resin-based vulcanizing agent include a brominated product of an alkylphenol resin, a mixed crosslinking system containing a halogen donor such as tin chloride, chloroprene, and the like and an alkylphenol resin, and for example, about 1 to 20 phr can be used.

[0038]

As others, they are a flower of zinc (5phr degree) and magnesium oxide (4phr degree), Examples thereof include resurgese (about 10 to 20 phr), p-quinone dioxime, p-dibenzoylquinone dioxime, tetrachloro-p-benzoquinone, poly-p-dinitrosobenzene (about 2 to 10 phr), and methylene dianiline (about 0.2 to 10 phr).

[0039]

If necessary, a vulcanization accelerator may be added. As the vulcanization accelerator, a general vulcanization accelerator such as aldehyde, ammonia, guanidine, thiazole, sulfenamide, thiuram, dithioate, and thiourea can be used, for example, about 0.5 to 2 phr.

[0040]

Specifically, as an aldehyde-ammonia-based vulcanization accelerator, hexamethylenetetramine, such as hexamethylenetetramine, is used ; and as the aldehyde-based vulcanization accelerator, *****, etc., is used. As a sulfenamide-based vulcanization-promoting agent, such as dibenzo ***** (DM), 2-mercaptobenzothiazole and its Zn salts, cyclohexylamine salts and the like, there is provided cyclohexylbenzothiazylfenamide (CBS), N- ***** - 2 - *****. As thiuram system rubber accelerators, such as N-t-butyl-2-benzothiazole sulfene amide and 2-(*** poly nil dithio) benzothiazole, they are tetramethyl thiuram disulfide (TMTD) and tetraethylthiuram disulfide, A dithioacid salt-type vulcanizing accelerator such as a tetramethylthiuram monosulfide (TMTM), a *****, or the like is used. Zn - *****, Zn - diethyl dithiocarbamate, Zn - di-n *****, Zn - *****, Te - diethyl dithiocarbamate, Cu - *****
 *****Examples of the thiourea-based vulcanizing accelerator such as Fe - ***** and ***** include ethylene thiourea and diethyl thiourea.

[0041]

Further, as the vulcanization accelerating aid, a general rubber auxiliary agent can be used together, and for example, zinc white (about 5 phr), Stearic Acid, oleic acid, and Zn salts thereof (about 2 to 4 phr) can be used.

[0042]

In a method of manufacturing a thermoplastic elastomer composition, a thermoplastic resin and an elastomer (an unvulcanized material in the case of a rubber) are melt-kneaded in a 2 axis kneading extruder or the like, and an elastomer is dispersed as a dispersed phase (domain) in a thermoplastic resin forming a continuous phase (matrix). When vulcanizing an elastomer



er, a vulcanizing agent may be added under kneading to dynamically vulcanize the elastomer. Also, various compounding agents (excluding vulcanizing agents) to the thermoplastic resin or elastomer may be added during the kneading, but it is preferable to mix them in advance before kneading. The kneading machine used for kneading the thermoplastic resin and the elastomer is not particularly limited, and a screw extruder, a kneader, a Banbury mixer, a 2 axis kneading extruder, or the like can be used. In particular, a 2 axis kneading extruder is preferably used for kneading the thermoplastic resin and elastomer and for dynamically vulcanizing the elastomer. Further, 2 or more kinds of kneading machines may be used and kneaded sequentially. As a condition for melt-kneading, the temperature may be equal to or higher than a temperature at which the thermoplastic resin melts. Further, it is preferable that the shear rate at the time of kneading is 1000-7500sec⁻¹. Preferably, the total time of kneading is from 30 seconds to 10 minutes, and when the vulcanizing agent is added, the vulcanization time after the addition is from 15 seconds to 5 minutes. The polymer composition produced by the above method may be formed into a desired shape by a conventional molding method of a thermoplastic resin such as injection molding or extrusion molding.

[0043]

The thermoplastic elastomer composition thus obtained has a structure in which an elastomer is dispersed as a discontinuous phase in a matrix of a thermoplastic resin. By adopting such a structure, sufficient rigidity can be imparted to the film layer by sufficient flexibility and effect of the resin layer as a continuous phase, and molding processability equivalent to that of the thermoplastic resin can be obtained at the time of molding without depending on a degree of the elastomer.

[0044]

The Young's modulus of the thermoplastic resin and the thermoplastic elastomer composition in a standard atmosphere defined by a JIS K7100 is not particularly limited, but is preferably 1 to 500 MPa, more preferably 50 to 500 MPa.

[0045]

Although the thermoplastic resin or the thermoplastic elastomer composition may be formed into a sheet or a film and used alone, an adhesive layer may be laminated in order to enhance adhesion to an adjacent rubber. As an example of the polymer for adhesion which constitutes this adhesive layer, they are 1 million or more molecular weights preferably 3 million or more ultra high molecular weight polyethylene (UHMWPE), an ethylene ethyl acrylate copolymer (EEA), and ethylene methyl acrylate resin (EMA), Acrylate copolymers such as ethylene acrylic acid copolymers (EAA) and maleic anhydride adducts thereof, polypropylene (PP) and maleic acid modified products thereof, ethylene propylene copolymers and maleic acid modified products thereof. Examples thereof include a polybutadiene resin, a maleic anhydride-modified product thereof, a styrene-butadiene-styrene copolymer (SBS), a styrene-ethylene-butadiene-styrene copolymer (SEBS), a fluorine-based thermoplastics, and a polyester-based thermoplastics. They can be extruded into a sheet or a film by, for example, a resin extruder according to a conventional method. Although there is no particular limitation on the thickness of the adhesive layer, a thickness of the adhesive layer is preferably small to reduce the weight of the tire, and is preferably from 5 μm to 150 μm.

[Examples]

[0046]

A tire is a 235/40R18 91W, and a laminate including a 3 layer film layer arranged on a tire surface and a base rubber layer arranged on a lower side of the film layer is provided on an outer wall of a sidewall portion. A thermoplastic elastomer composition obtained by blending a thermoplastic resin with an elastomer is vulcanized, and a pneumatic tire colored with a color different from a black base rubber layer (red, blue, green) is vulcanized, and then, as shown in FIG. 2, the film layer is vulcanized. A plurality of openings having different depths are formed in the film layer by laser processing, and 2 film layers having different color from the outermost film layer are exposed through openings having different depths. A tire of Example 1 was prepared in which a laminate with an opening displayed a color display drawn based on a combination of 3 colors.

[0047]

As a thermoplastic elastomer composition constituting a film layer, a base material having a formulation shown in Table 1 was prepared, and a proper amount of pigment was added thereto to obtain red, blue or green. Further, each film layer had a thickness of about 60 μm. On the other hand, a rubber composition having a composition shown in Table 2 was used as a tie rubber layer to be a base rubber layer.

[0048]

[Table 1]



		質量部
BIMS ^{a)}	エクソンモービルケミカル社製「Exxpro 3035」	100
酸化亜鉛	正同化学工業(株)製「亜鉛華3号」	0.5
ステアリン酸	工業用ステアリン酸	0.2
ステアリン酸亜鉛	日油(株)製「ステアリン酸亜鉛」	1
N6/66	宇部興産(株)製「UBEウベナイロン5033B」	100
変性E EA ^{b)}	三井・デユボンポリケミカル(株)製「HPR-AR201」	10

Remarks: a) bromination isobutylene-p-methylstyrene copolymer

B) Maleic anhydride denaturation ethylene-ethyl acrylate copolymer

[0049]

[Table 2]



質量部	
スチレンブタジエンゴム	日本ゼオン株式会社製 「Nipol 1502」
天然ゴム	SIR-20
カーボンブラック	東海カーボン株式会社製 「シーストV」
ステアリン酸	工業用ステアリン酸
アロマオイル	昭和シェル石油株式会社製 「デソレックス3号」
酸化亜鉛	正岡化学工業株式会社製 「亜鉛華3号」
変性レゾルシン・ホルムアルデヒド縮合体	田岡化学工業株式会社製 「スミカノール620」
メチレンドナー	変性エーテル化メチロールメラミン 田岡化学工業株式会社製 「スミカノール507AP」
硫黄	5%油展処理硫黄
加硫促進剤	ジ... 2...ベンゾチアゾリルスルフィド 大内新興化学工業株式会社製 「ノタセラ-DM」
	2. 2

[0050]

When a color display displayed on a laminate having an opening is confirmed for the tire of Example 1 described above, the color display has a vivid color. Moreover, in the tire of Example 1, a color display article formed on the basis of the shape or arrangement of an opening portion is different from a display article formed by printing such as an inkjet method, and therefore, even in a pneumatic tire exposed to a sunshine or wind and rain, it is difficult to peel off and display can be performed over a long period of time and *.

[Explanation of letters or numerals]

[0051]

- 1 Tread Part
- 2 sidewall portion
- 3 bead portion
- 10 Laminated Body
- 11,12,13 film layer
- 14 Ground Rubber Layer
- 15 opening
- 16 color display
- 17 Information-Display Element

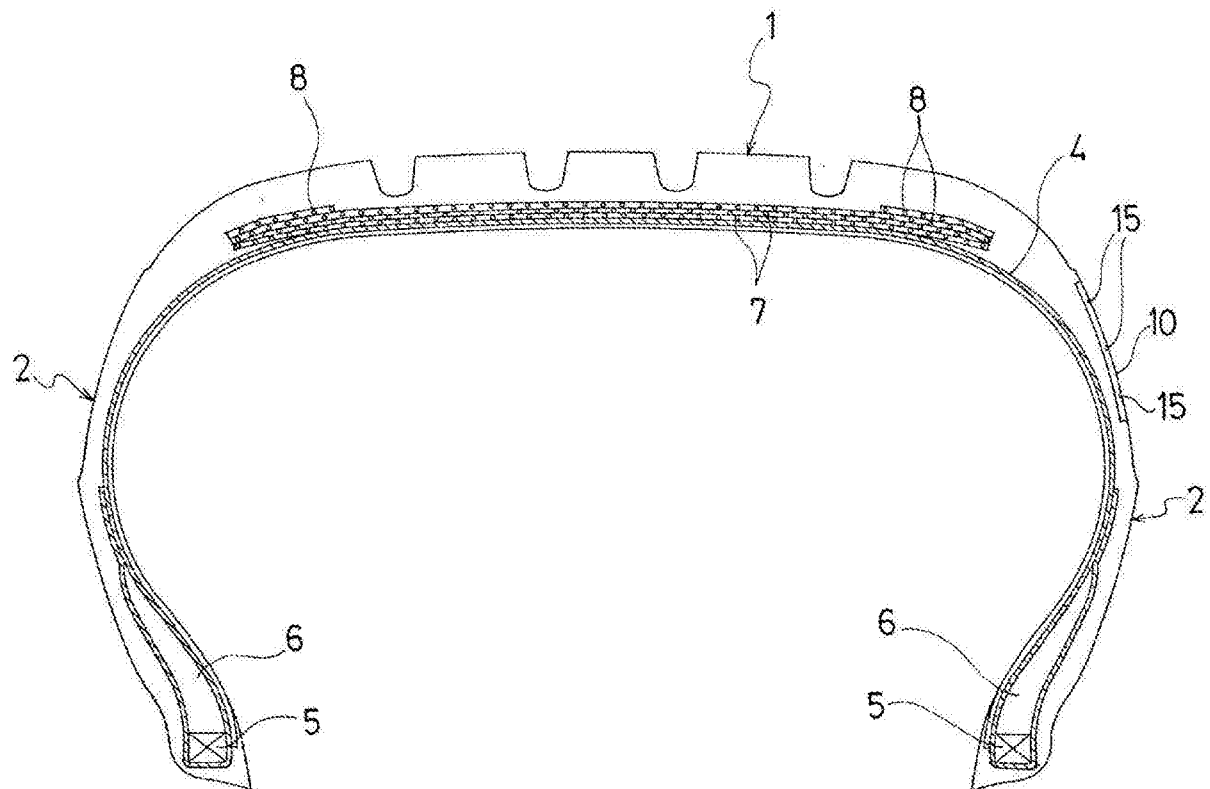


18 information display

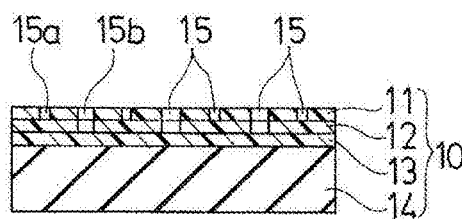
Drawings

Close

[FIG.1]

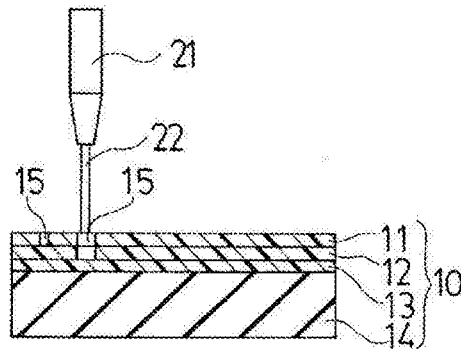


[FIG.2]

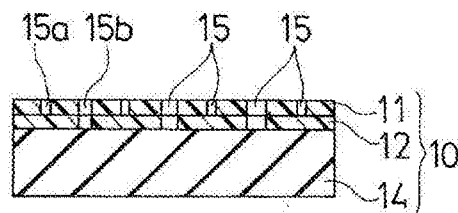


[FIG.3]

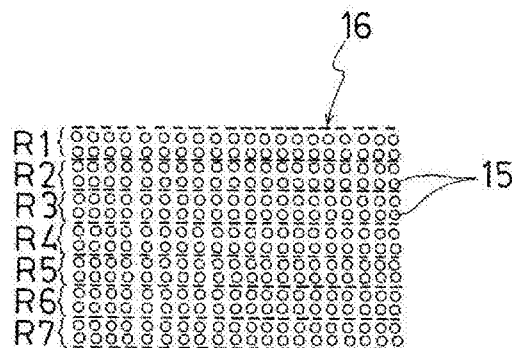




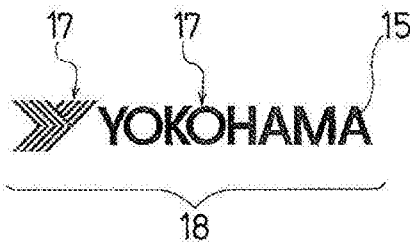
[FIG. 4]



[FIG. 5]



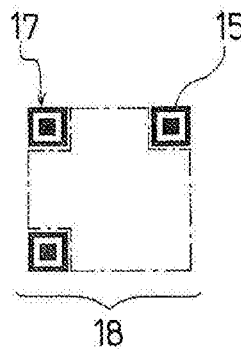
[FIG. 6]



[FIG. 7]



[FIG. 8]



Drawings

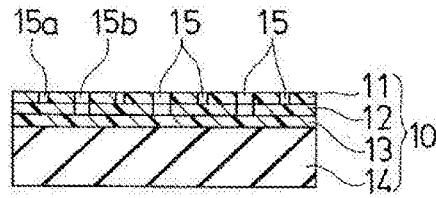
Close

Representative drawing

1 2 3 4 5 6 7 8

Enlarge and Rotate





Representative drawing

< 1 of 1 Display >



INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		16201903
	Filing Date		2018-11-27
	First Named Inventor	Keith George Ferry	
	Art Unit	1762	
	Examiner Name	Fred M. Teskin	
	Attorney Docket Number	67838.00217	

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	2	2014213718	JP	A	2014-11-17	YOKOHAMA RUBBER CO LTD		×
	3	2004299201	JP	A	2004-10-28	NISSHA PRINTING		☒

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STATEMENT BY APPLICANT**
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Examiner Name	Fred M. Teskin
Attorney Docket Number	67838.00217

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**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	16201903
Filing Date	2018-11-27
First Named Inventor	Keith George Ferry
Art Unit	1762
Examiner Name	Fred M. Teskin
Attorney Docket Number	67838.00217

CERTIFICATION STATEMENT

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

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

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

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SIGNATURE

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

Signature	/Grant T. Langton/	Date (YYYY-MM-DD)	2020-05-19
Name/Print	Grant T. Langton	Registration Number	39,739

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Bibliographic data: JP2004299201 (A) — 2004-10-28

**TRANSFER SHEET FOR DECORATING RUBBER PRODUCT, AND
MANUFACTURING METHOD FOR DECORATED RUBBER PRODUCT**

Inventor(s): YAMAGUCHI YOICHI ± (YAMAGUCHI YOICHI)
Applicant(s): NISSHA PRINTING ± (NISSHA PRINTING CO LTD)
Classification: - **international:** **B32B27/00; B44C1/17;** (IPC1-7): B32B27/00;
B44C1/17
- **cooperative:**
Application JP20030093785 20030331
number:
Priority number(s): JP20030093785 20030331

Abstract of JP2004299201 (A)

PROBLEM TO BE SOLVED: To manufacture a decorated rubber product which can enhance abrasion resistance. **SOLUTION:** In this transfer sheet for decorating the rubber product, a peel ply, which is composed of a urethane resin and a vinyl chloride resin, and a pattern ply, which is composed of a urethane resin, are formed at least on a substrate sheet in such a manner as to be sequentially laminated thereon. The transfer sheet is placed on an unvulcanized rubber material, and the pattern ply is transferred by peeling the substrate sheet after the vulcanization of the rubber material, so that the decorated rubber product can be manufactured. **COPYRIGHT:** (C) 2005,JPO&NCIP

(19) 日本国特許庁(JP)

(12) 公開特許公報(A)

(11) 特許出願公開番号

特開2004-299201

(P2004-299201A)

(43) 公開日 平成16年10月28日(2004.10.28)

(51) Int.Cl. ⁷	F 1	テーマコード (参考)
B 4 4 C 1/17	B 4 4 C 1/17	3 B 0 0 5
B 3 2 B 27/00	B 3 2 B 27/00	4 F 1 0 0

審査請求 未請求 請求項の数 2 O L (全 5 頁)

(21) 出願番号	特願2003-93785 (P2003-93785)	(71) 出願人	000231361
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			本写真印刷株式会社内
		Fターム(参考)	3B005 EA01 EB01 EB03 EC02 FA05
			FB03 FB23 FC02X FC09X FC09Z
			GB01
			4F100 AK01A AK15B AK51 AK51B AL05B
			AT00A BA02 EC04 EJ06 GB74
			HB00 JK06 JL06 JL14B

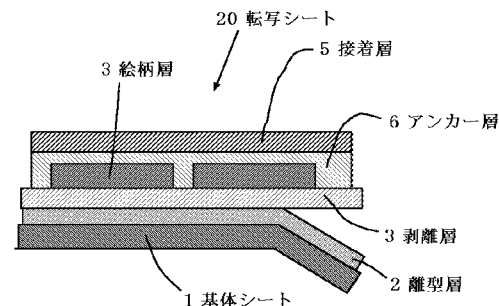
(54) 【発明の名称】 ゴム製品加飾用転写シートおよび加飾ゴム製品の製造方法

(57) 【要約】 (修正有)

【解決手段】 少なくとも基体シート上に、ウレタン系樹脂と塩化ビニル系樹脂とからなる剥離層、およびウレタン系樹脂からなる絵柄層が順次積層形成されたゴム製品加飾用転写シートである。未加硫のゴム材にこの転写シートを載置し、該ゴム材を加硫した後、基体シートを剥離して絵柄層を転写する加飾ゴム製品の製造方法である。

【効果】 摩耗性に優れた加飾ゴム製品を製造することが可能になるという効果を有する。

【選択図】 図1



【特許請求の範囲】**【請求項 1】**

少なくとも基体シート上に、ウレタン系樹脂と塩化ビニル系樹脂とからなる剥離層、およびウレタン系樹脂からなる絵柄層が順次積層形成されたゴム製品加飾用転写シート。

【請求項 2】

未加硫のゴム材に請求項 1 記載の転写シートを載置し、該ゴム材を加硫した後、基体シートを剥離して絵柄層を転写する加飾ゴム製品の製造方法。

【発明の詳細な説明】**【0001】****【発明の属する技術分野】**

この発明は、ゴムシート、ゴムマット、自動車、自転車などのタイヤ、引き布、文具などのグリップパーツ、靴底、長靴などの全ゴム製靴などの各種ゴム製品に任意の多色柄を加飾するための転写シート、およびそれを用いた加飾ゴム製品の製造方法に関する。

【0002】**【従来の技術】**

従来、未加硫ゴムに用いる転写シートとしては、特許文献 1 に紹介されたものが知られており、この転写シートでは表面保護層としてウレタン系、ポリアミド系、ポリアミノ酸系樹脂のうちの一つを含む樹脂を用いる方法が紹介されている。そして、これらの樹脂を使うことで柔軟な表面保護膜が形成され、絵柄層がゴムの延伸に追従して伸ばされるという効果がある。

【0003】**【特許文献 1】特開昭 48-057868****【発明が解決しようとする課題】**

しかし、特許文献 1 に示された転写シートでは、表面保護層に柔軟性を付与することはできるが、表面の滑りが悪く、布などで擦ると簡単に表面が傷つく問題があった。

【0004】**【課題を解決するための手段】**

本発明では、上述の問題を解決するために、少なくとも基体シート上に、ウレタン系樹脂と塩化ビニル系樹脂とからなる剥離層、およびウレタン系樹脂からなる絵柄層が順次積層形成されたゴム製品加飾用転写シートを発明した。

【0005】

また、未加硫のゴム材にこの転写シートを載置し、該ゴム材を加硫した後、基体シートを剥離して絵柄層を転写する加飾ゴム製品の製造方法を発明した。この方法により、摩耗性に優れた加飾ゴム製品を製造することが可能になった。

【0006】**【発明の実施の形態】**

以下、図面を参照しながらこの発明を詳しく説明する。

【0007】

図 1 は本発明のゴム製品加飾用転写シートの構成を示すものである。この転写シート 20 は、少なくとも基体シート 1 上に、ウレタン系樹脂と塩化ビニル系樹脂とからなる剥離層 3、およびウレタン系樹脂からなる絵柄層 4 が順次積層形成されたものである。

【0008】

基体シート 1 は、ポリエステル系樹脂、ポリプロピレン系樹脂、塩化ビニル樹脂、ポリエチレン樹脂、ポリエチレンテレフタレート樹脂、ポリカーボネート樹脂、ナイロン樹脂、ビニロン樹脂、アセテート樹脂、ポリエチレン系樹脂、ポリアミド系樹脂、ポリアクリル系樹脂、ポリ塩化ビニル系樹脂等のプラスチックシートである。

【0009】

基体シート 1 の厚さとしては、 $5\mu\text{m}$ ～ $200\mu\text{m}$ が好ましい。 $5\mu\text{m}$ 未満であるとしわが入りやすく、 $200\mu\text{m}$ を超えるとかさばりやすく取り扱いにくい。

【0010】

なお、基体シート1の剥離層3が形成される側の表面に、ヘアライン目の意匠を形成したり、顔料インキで凹凸層を形成しマット意匠を形成したりして艶消し表面を形成してもよい。このヘアライン目の意匠やマット意匠は、部分的に形成してもよい。

【0011】

基体シート1はそれ自体で剥離層3と剥離性を有するものもあるが、より剥離性を安定させるために、基体シート1と剥離層3との間に基体シート1とともに剥離除去される離層2をコーティング等により形成してもよい。離層2の材質としてはシリコン、メラミン、アルキッド、エポキシ等の硬化性樹脂等が挙げられる。

【0012】

剥離層3は、ゴム下地に転移した後、基体シート1から剥離したときに表面保護膜となる層である。剥離層3にはウレタン系と塩化ビニル系樹脂を配合した樹脂を使用する。ウレタン系樹脂に塩化ビニル系樹脂を配合することで剥離層の滑り性が向上し、摩耗性が向上する。 10

【0013】

その配合比は、ウレタン系樹脂100重量部に対し塩化ビニル系樹脂20～300重量部の範囲が好ましい。これより塩化ビニル系樹脂の量が少ないと摩耗性が向上しにくく、これより塩化ビニル系樹脂の量が多いと柔軟性が低下しやすい。

【0014】

剥離層3の膜厚は、3～30 μ mが望ましい。3 μ m未満では耐摩耗性に欠け、30 μ mを超えるとコーティングが難しい。剥離層3はリバースコート、ダイレクトリップコート、マイクログラビアコート、スクリーン印刷等によって形成する。 20

【0015】

絵柄層4はゴム製品に施す絵柄を形成する層である。絵柄層4はウレタン系樹脂で形成する。柔軟性のあるウレタン系樹脂を用いることで、ゴムの延伸に対して絵柄層4が追従し延伸が可能となる。絵柄層4はグラビア印刷、スクリーン印刷等によって形成する。

【0016】

なお、このほかに転写シート20に接着層5やアンカー層6を適宜設けてもよい。接着層5は他の被接着体に接着させるための層であり、アンカー層6は各層間の密着が不足している場合にそれを補う層である。

【0017】

得られた転写シート20の剥離層3、絵柄層4、接着層5およびアンカー層6は、ゴムの加硫工程においてゴム製品に転写される。ゴムの加硫方法は、プレス機による方法と加硫炉を通す方法とがある。 30

【0018】

図2はプレス機による加硫方法を示したものである。未加硫のゴム材7と転写シート20とを接着層5の面とゴム材7が接するように重ね、この積層体をプレス型8内に載置し5～30分間プレスする。このときの熱盤温度は100～160℃、プレス圧は10～150kgfが好ましい。プレスした後、ゴム材7から基体シート1を剥がすことにより、所望の加飾がされた加飾ゴム製品30が得られる。

【0019】

図3は加硫炉9を通す加硫方法を示したものである。まず、加硫炉9内に通す前に、未加硫のゴム材7と転写シート20とを接着層5の面とゴム材7が接するように重ね、この積層体を金属またはシリコンラバー等からなるロール10によって圧着しておく。 40

【0020】

つぎに、ゴム材7と転写シート20とを圧着させた積層体を30秒～30分かけて加硫炉9内に通す。加硫炉9としては、100～160℃の加熱炉もしくは超音波加熱炉がある。加硫炉9に通した後、ゴム材7から基体シート1を剥がすことにより、所望の加飾がされた加飾ゴム製品30が得られる。

【0021】

【実施例】

50

25 μ mのポリエステルフィルムからなる基体シート上にメラミン系樹脂からなる離型層を設けた後、離型層上にリバースコートによってウレタン系樹脂と塩化ビニル系樹脂（比率1：1）とからなる剥離層を設け、次いで剥離層の上にグラビア印刷によってウレタン系樹脂からなる絵柄層を設けて、転写シートを作成した。

【0022】

この転写シートの絵柄層と未加硫のゴム材とが接するように重ね、この積層体をプレス型内に載置した後、熱盤温度を140℃、プレス圧を50kgfとして30分プレスした。プレス終了後、積層体をプレス型から取り出し、基体シートを剥がしたところ、絵柄が形成された加飾ゴム製品が得られた。

【0023】

この加飾ゴム製品と、剥離層をウレタン系樹脂のみとしそれ以外はこの方法と同じにして得られた加飾ゴム製品とについて、摩耗性を比較した結果、表1のようなになった。

【0024】

この表1において、摩耗性は、ネル布を巻き付けた150g荷重の重りをゴム製品表面に載せ、振幅20mmの往復運動をしたとき、絵柄層が剥がれて下地が露出するまでの重りの往復回数を測定することで評価した。この表1の結果から、本発明による加飾ゴム製品が従来の加飾ゴム製品よりも摩耗性に優れたものであることが分かる。

【0025】

【表1】

剥離層の材質	剥離層の膜厚 (μ m)	結果(回)
ウレタン樹脂：塩化 ビニル樹脂＝1：1	5	650
	10	1000以上
ウレタン樹脂 のみ	8	150
	14	100

【0026】

【発明の効果】

本発明は、少なくとも基体シート上に、ウレタン系樹脂と塩化ビニル系樹脂とからなる剥離層、およびウレタン系樹脂からなる絵柄層が順次積層形成されたゴム製品加飾用転写シートである。したがって、本発明の転写シートは、剥離層の滑り性がよく摩耗性が高いという効果がある。また、本発明の転写シートは、絵柄層に柔軟性がありゴムの延伸に対して追従し延伸が可能となる効果がある。

【0027】

また、本発明は、未加硫のゴム材にこの転写シートを載置し、該ゴム材を加硫した後、基体シートを剥離して絵柄層を転写する加飾ゴム製品の製造方法である。したがって、本発明の加飾ゴム製品の製造方法は、摩耗性に優れた加飾ゴム製品を製造することが可能になるという効果がある。

【図面の簡単な説明】

【図1】本発明に係るゴム製品加飾用転写シートの一実施例を示す断面図である。

【図2】本発明に係る加飾ゴム製品の製造方法のうち、プレス機による方法の一実施例を示す断面図である。

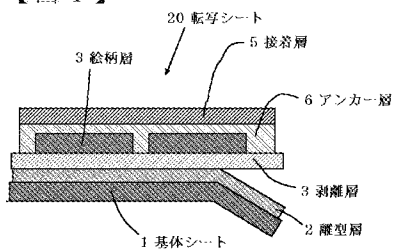
【図3】本発明に係る加飾ゴム製品の製造方法のうち、加硫炉を通す方法の一実施例を示す断面図である。

【符号の説明】

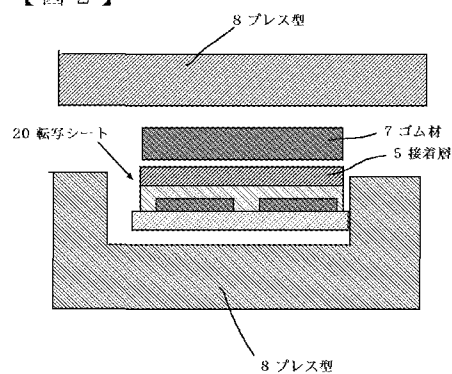
- 1 基体シート
- 2 離型層
- 3 剥離層
- 4 絵柄層

- 5 接着層
- 6 アンカー層
- 7 ゴム材
- 8 プレス型
- 9 加硫炉
- 10 ロール
- 20 転写シート
- 30 加飾ゴム製品

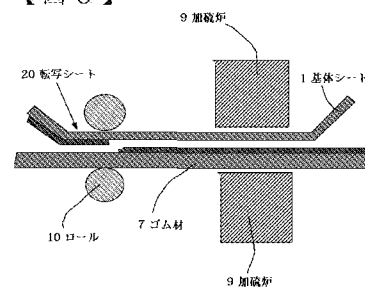
【図 1】



【図 2】



【図 3】



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Bibliography

Close

(19) [Publication country/region] JP

(12) [Kind of official gazette] A

(11) [Publication number] 2004299201

(43) [Date of publication of application] 20041028

(54) [Title of the invention] TRANSFER SHEET FOR DECORATING RUBBER PRODUCT, AND MANUFACTURING METHOD FOR DECORATED RUBBER PRODUCT

(51) [International Patent Classification 7th Edition]

B44C 1/17 B32B 27/00

[FI]

B44C 1/17 N

B32B 27/00 L

(21) [Application number] 2003093785

(22) [Filing date] 20030331

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[Theme code (reference)]

3B005

4F100

[F-term (reference)]

3B005EA01

3B005EB01

3B005EB03

3B005EC02

3B005FA05

3B005FB03

3B005FB23

3B005FC02X
 3B005FC09X
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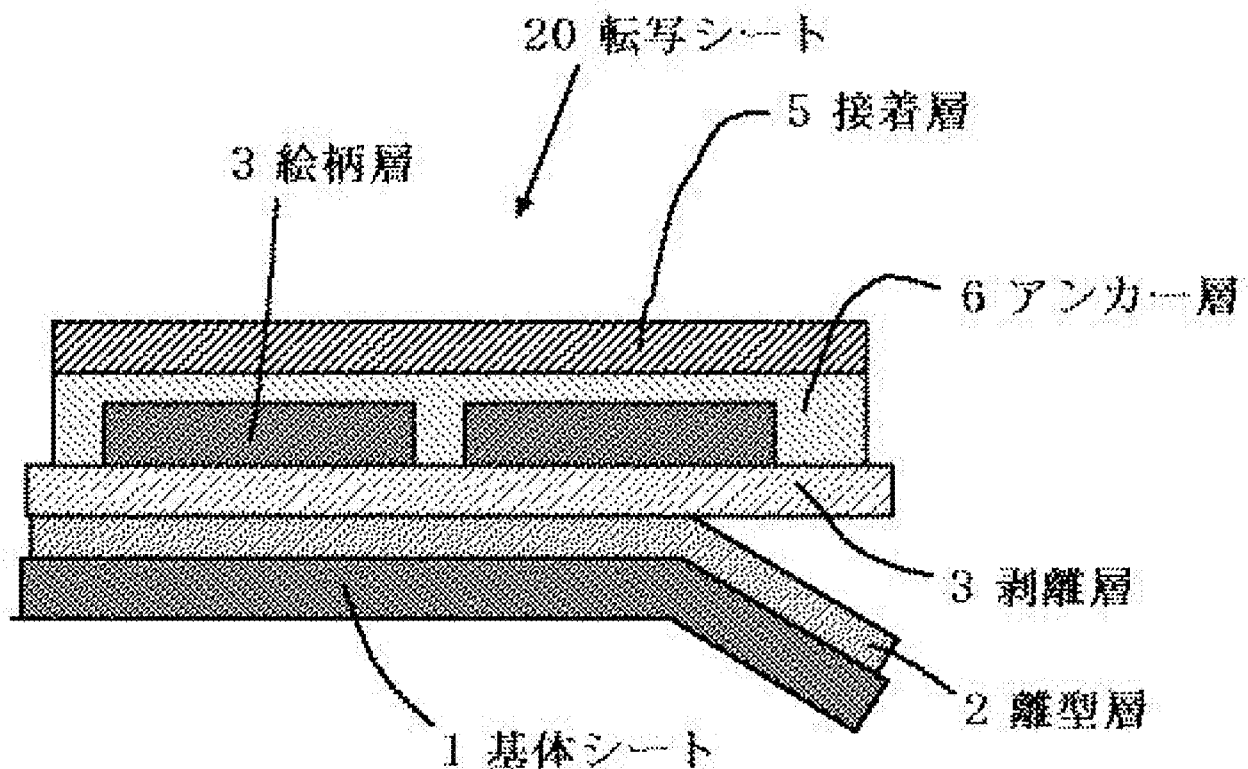
Overview

Close

(57) [Overview]

PROBLEM TO BE SOLVED: To manufacture a decorated rubber product which can enhance abrasion resistance.

SOLUTION: In this transfer sheet for decorating the rubber product, a peel ply, which is composed of a urethane resin and a vinyl chloride resin, and a pattern ply, which is composed of a urethane resin, are formed at least on a substrate sheet in such a manner as to be sequentially laminated thereon. The transfer sheet is placed on an unvulcanized rubber material, and the pattern ply is transferred by peeling the substrate sheet after the vulcanization of the rubber material, so that the decorated rubber product can be manufactured.



Scope of Claims

Close

[Patent Claims]

[Claim 1]

In this transfer sheet for decorating a rubber product, a release layer consisting of a urethane-based resin and a vinyl chloride-based resin and a pattern layer consisting of a urethane-based resin are successively laminated on at least a substrate sheet.

[Claim 2]

A method for producing a decorative rubber product, comprising placing a transfer sheet of claim 1 on an unvulcanized rubber material, vulcanizing the rubber material, and peeling the base sheet to transfer the pattern layer.

Detailed Description

Close

[Detailed description of the invention]

[0001]

[Technical field of invention]

This invention relates to a transfer sheet for decorating an arbitrary multicolor pattern of a rubber article such as a rubber sheet, a rubber mat, a tire such as an automobile, a bicycle, a grip part such as a drawing cloth and a stationery, a shoe sole, and the like, and a method for manufacturing a decorative rubber product using the same.

[0002]

[Prior art]

Conventionally, as a transfer sheet used for an unvulcanized rubber, what is disclosed in Patent Document 1 has been known, and a method using a resin containing one of a urethane type, a polyamide type, and a polyamino acid type resin as a surface protective layer has been introduced. By using these resins, a flexible surface protective film is formed, and there is an effect that the pattern layer is extended following the stretching of the rubber.

[0003]

[Patent document 1] JP S 48 - 057868A

[Problem to be solved by the invention]

However, in the transfer sheet disclosed in Patent Document 1, although flexibility can be imparted to the surface protective layer, there has been a problem that the surface of the transfer sheet is deteriorated, and the surface of the transfer sheet is easily damaged by rubbing with a cloth or the like.

[0004]

[Means for solving the problem]

In order to solve the above problem, in the present invention, there is provided a transfer sheet for decorating a rubber product, wherein a release layer comprising a urethane-based resin and a vinyl chloride-based resin and a pattern layer comprising a urethane-based resin are sequentially laminated on at least a substrate sheet.

[0005]

In addition, a method for manufacturing a decorative rubber product has been invented in which the transfer sheet is placed on an unvulcanized rubber material, the rubber material is vulcanized, and then the base sheet is peeled off to transfer the pattern layer. By this method, it becomes possible to manufacture a decorative rubber product excellent in abrasion resistance.

[0006]

[Embodiment of invention]

Hereinafter, this invention is described in detail, referring to Drawings.

[0007]

FIG. 1 shows a structure of a transfer sheet for decorating a rubber product of the present invention. In this transfer sheet 2

0, a release layer 3 made of a urethane-based resin and a vinyl chloride-based resin and a pattern layer 4 made of a urethane-based resin are laminated and formed in this order on at least a base sheet 1.

[0008]

The base sheet 1 is a polyester resin, a polypropylene resin, a vinyl chloride resin. This is a plastic sheet such as a polyethylene resin, a polyethylene terephthalate resin, a polycarbonate resin, a nylon resin, a vinylon resin, an acetate resin, a polyethylene resin, a polyamide resin, a polyacrylic resin, and a polyvinyl chloride resin.

[0009]

The thickness of the base sheet 1 is preferably from 5 μ m to 200 μ m. If the thickness is less than 5 μ m, wrinkles tend to be formed, and it is easy to handle to exceed 200 μ m, which is difficult to handle.

[0010]

It is also possible to form a matte surface on the surface of the substrate sheet 1 on which the release layer 3 is formed, by forming a design of a hairline, forming an uneven layer with a pigment ink, and forming a mat design. The design and the mat design of the hairline may be partially formed.

[0011]

Although some of the base sheet 1 has releasability from the release layer 3, a release layer 2 that is peeled and removed together with the base sheet 1 between the base sheet 1 and the release layer 3 may be formed by coating or the like in order to stabilize the releasability. Examples of the material of the release layer 2 include a curable resin such as silicone, melamine, alkyd, and epoxy.

[0012]

The release layer 3 is a layer which becomes a surface protective film when it is separated from the substrate sheet 1 after being transferred to a rubber substrate. A resin containing a urethane group and a vinyl chloride group is used for the release layer 3. When a vinyl chloride-based resin is blended with a vinyl chloride-based resin, slipperiness of the peelable layer is improved and abrasion resistance is improved.

[0013]

The blending ratio is preferably within a range of 20 to 300 parts by weight of the vinyl chloride-based resin per 100 parts by weight of the urethane-based resin. If the amount of the vinyl chloride-based resin is smaller than this, the abrasion resistance is difficult to improve, and if the amount of the vinyl chloride-based resin is larger than this, the flexibility tends to be lowered.

[0014]

The thickness of the separation layer 3 is preferably 3 to 30 μ m. If it is less than 3 μ m, abrasion resistance is lost, and if it exceeds 30 μ m, coating is difficult. The release layer 3 is formed by a reverse coating, a direct lip coating, a microgravure coating, a screen printing, or the like.

[0015]

The pattern layer 4 is a layer forming a pattern to be applied to a rubber product. The pattern layer 4 is made of urethane resin. By using a flexible urethane-based resin, the pattern layer 4 follows the stretching of the rubber and can be stretched. The pattern layer 4 is formed by gravure printing, screen printing, or the like.

[0016]

In addition, an adhesive layer 5 and an anchor layer 6 may be provided as appropriate on the transfer sheet 20. The adhesive layer 5 is a layer for adhering to another adherend, and the anchor layer 6 is a layer for compensating for the insufficient adhesion between the layers.

[0017]

The release layer 3, the pattern layer 4, the adhesive layer 5, and the anchor layer 6 of the transfer sheet 20 obtained are transferred to a rubber product in a rubber vulcanization process. A method for vulcanizing rubber includes a method of using a press machine and a method of passing through a vulcanizing furnace.

[0018]

FIG. 2 shows a vulcanizing method using a press machine. The unvulcanized rubber material 7 and the transfer sheet 20 are superposed on each other so that the surface of the adhesive layer 5 and the rubber material 7 are brought into contact with each other, and the laminated body is placed in the press mold 8 and pressed for 5 to 30 minutes. 100-160 degrees C and pressure have [the heating plate temperature at this time] preferable 10 - 150kgf. After pressing, the base sheet 1 is peeled off from the rubber material 7 to obtain a decorative rubber product 30 having a desired decoration.

[0019]

FIG. 3 shows a vulcanizing method for passing through the vulcanizing furnace 9. First, before passing into the vulcanizing furnace 9, the unvulcanized rubber material 7 and the transfer sheet 20 are overlapped with each other so that the surface of the adhesive layer 5 and the rubber material 7 come into contact with each other, and the laminate is pressed by a roll 10 m

ade of metal or silicone rubber or the like.

[0020]

Next, a laminate obtained by pressure-bonding the rubber material 7 and the transfer sheet 20 is passed through the vulcanizing furnace 9 for 30 seconds to 30 minutes. As the vulcanizing furnace 9, a heating furnace or an ultrasonic heating furnace of 100 to 160 ° C. is available. After passing through the vulcanizing furnace 9, the base sheet 1 is peeled from the rubber material 7 to obtain a decorative rubber product 30 with a desired decoration.

[0021]

[Examples]

A mold release layer made of a melamine-based resin is provided on a base sheet consisting of a polyester film of 25 μ m. A release layer consisting of a urethane resin and a vinyl chloride resin (ratio : 1:1) was provided on a release layer by a reverse coat, and a pattern layer made of a urethane resin was provided on the release layer by gravure printing to prepare a transfer sheet.

[0022]

This transfer sheet was superposed so that the pattern layer and the unvulcanized rubber layer were brought into contact with each other, and the laminate was placed in a press mold, and then pressed for 30 minutes at a temperature of 140 ° C. and a press pressure of 50 kgf. After pressing, the laminate was taken out of the press mold and the base sheet was peeled off to obtain a decorative rubber product having a pattern formed thereon.

[0023]

As a result of comparison of the decorative rubber product and the decorative rubber product obtained by using only the urethane resin and other than the urethane resin, the abrasion resistance of the decorative rubber product was compared with that of the decorative rubber product, as shown in Table 1.

[0024]

In Table 1, the abrasion resistance was evaluated by measuring the number of times of reciprocation of a weight from a time when a weight of 150 g load with which a batt cloth was wound is placed on a rubber product surface and a time when a reciprocating motion of an amplitude of 20 is performed and a pattern layer is peeled off to expose an underlying surface. From the results shown in Table 1, it is understood that the decorative rubber product according to the present invention has better abrasion resistance than conventional decorative rubber products.

[0025]

[Table 1]

剥離層の材質	剥離層の膜厚 (μ m)	結果 (回)
ウレタン樹脂 : 塩化 ビニル樹脂 = 1 : 1	5	6 5 0
	1 0	1 0 0 0 以上
ウレタン樹脂 のみ	8	1 5 0
	1 4	1 0 0

[0026]

[Effect of the Invention]

In this transfer sheet for decorating a rubber product, a release layer consisting of a urethane-based resin and a vinyl chloride-based resin and a pattern layer consisting of a urethane-based resin are successively laminated on at least a substrate sheet. Accordingly, the transfer sheet of the present invention has an effect of good slipperiness of the release layer and high abrasion resistance. In addition, the transfer sheet of the present invention has an effect of being flexible in the pattern layer, and capable of being stretched in compliance with stretching of the rubber.

[0027]

In addition, the present invention is a method of manufacturing a decorative rubber product, wherein the transfer sheet is placed on an unvulcanized rubber material, the rubber material is vulcanized, and then the base sheet is peeled off to transfer the pattern layer. Therefore, the method for producing a decorative rubber product of the present invention has an effect that a decorative rubber product excellent in abrasion resistance can be manufactured.

[Brief Description of the Drawings]

[Fig. 1] FIG. 1 is a cross-sectional view showing an embodiment of a transfer sheet for decorating a rubber product according to the present invention ;.

[Fig. 2] FIG. 1 is a cross-sectional view showing an embodiment of a method using a press machine of a method of manufacturing a decorative rubber product according to the present invention ;.

[Fig. 3] FIG. 1 is a cross-sectional view showing an embodiment of a method of passing a decorative rubber product according to the present invention through a vulcanizing furnace ;.

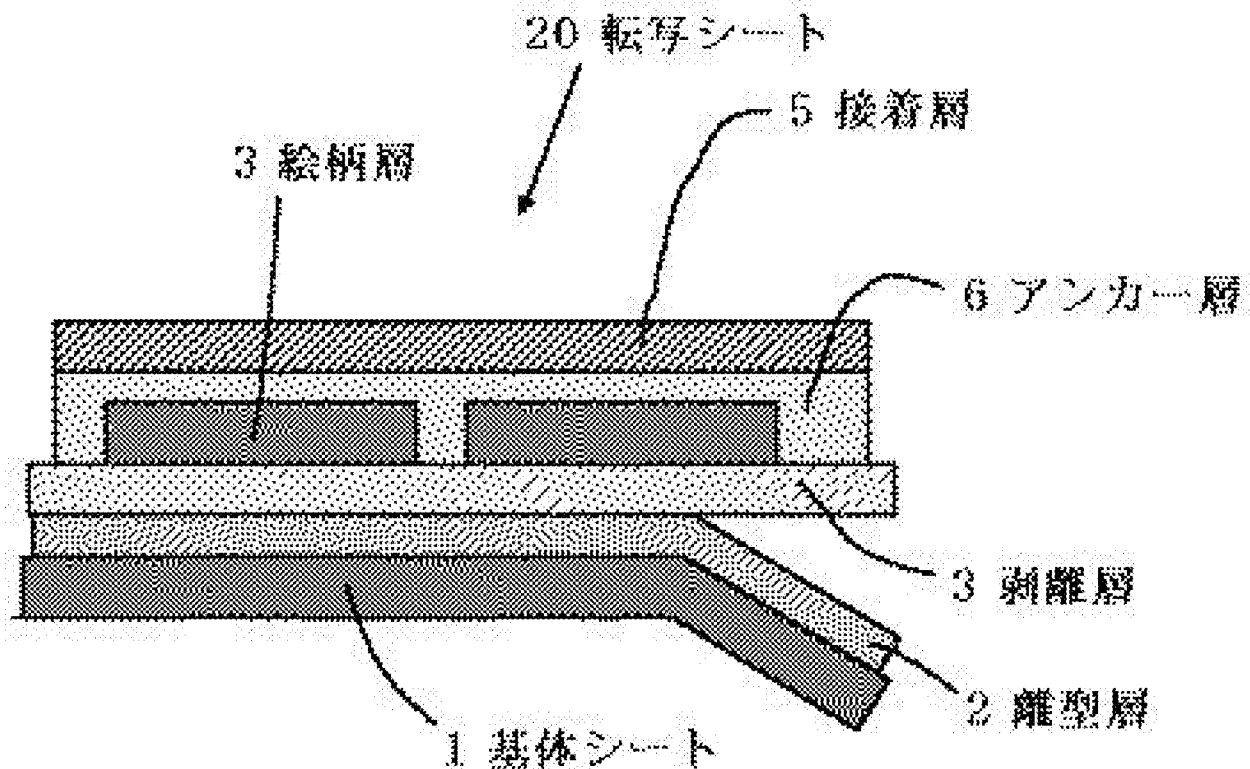
[Explanation of letters or numerals]

- 1 substrate sheet
- 2 Releasing Layer
- 3 Stratum Disjunctum
- 4 Pattern Layer
- 5 Adhesive Layer
- 6 Anchor Layer
- 7 Rubber Material
- 8 Press Die
- 9 Vulcanization Furnace
- 10 Roll
- 20 Transfer Sheet
- 30 Decoration Rubber Goods

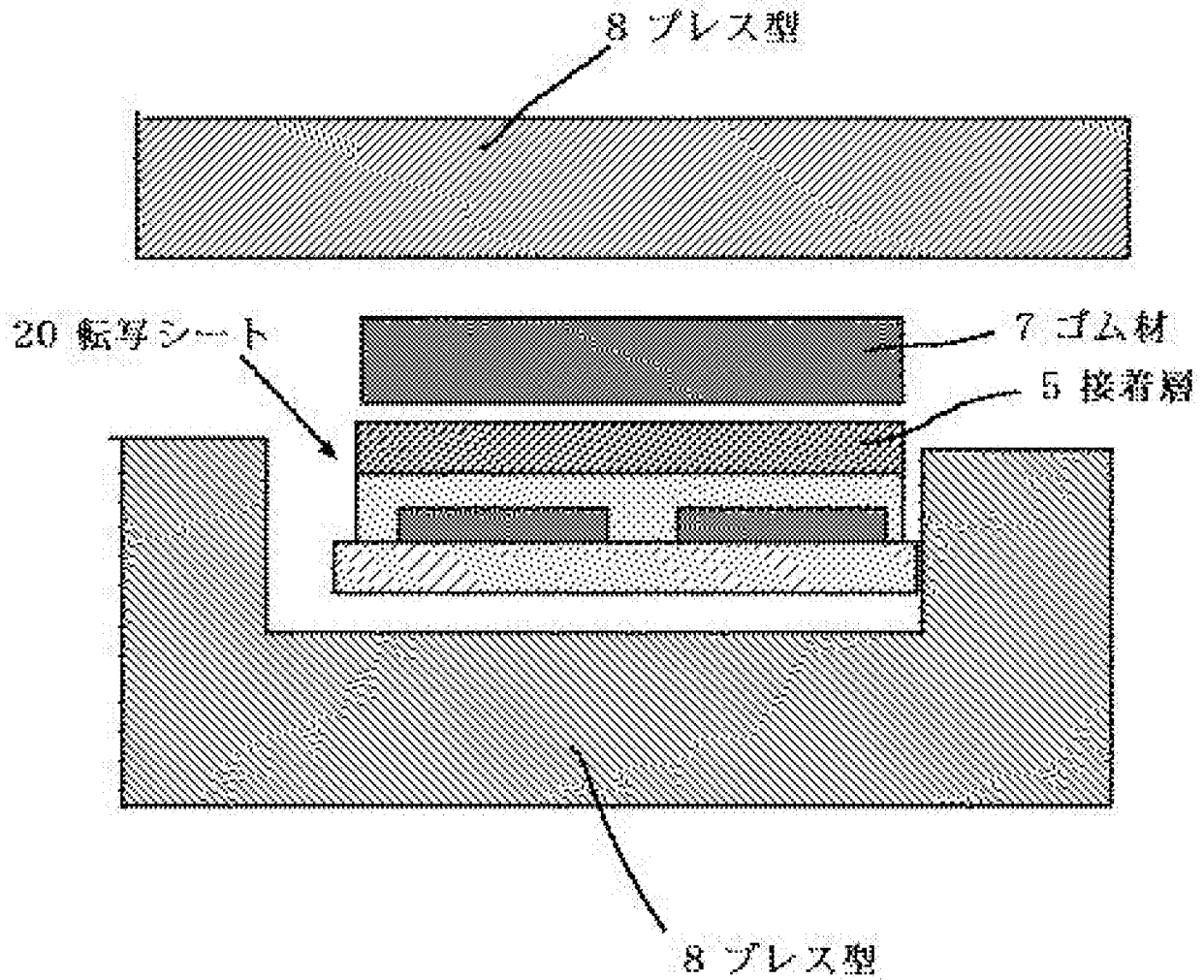
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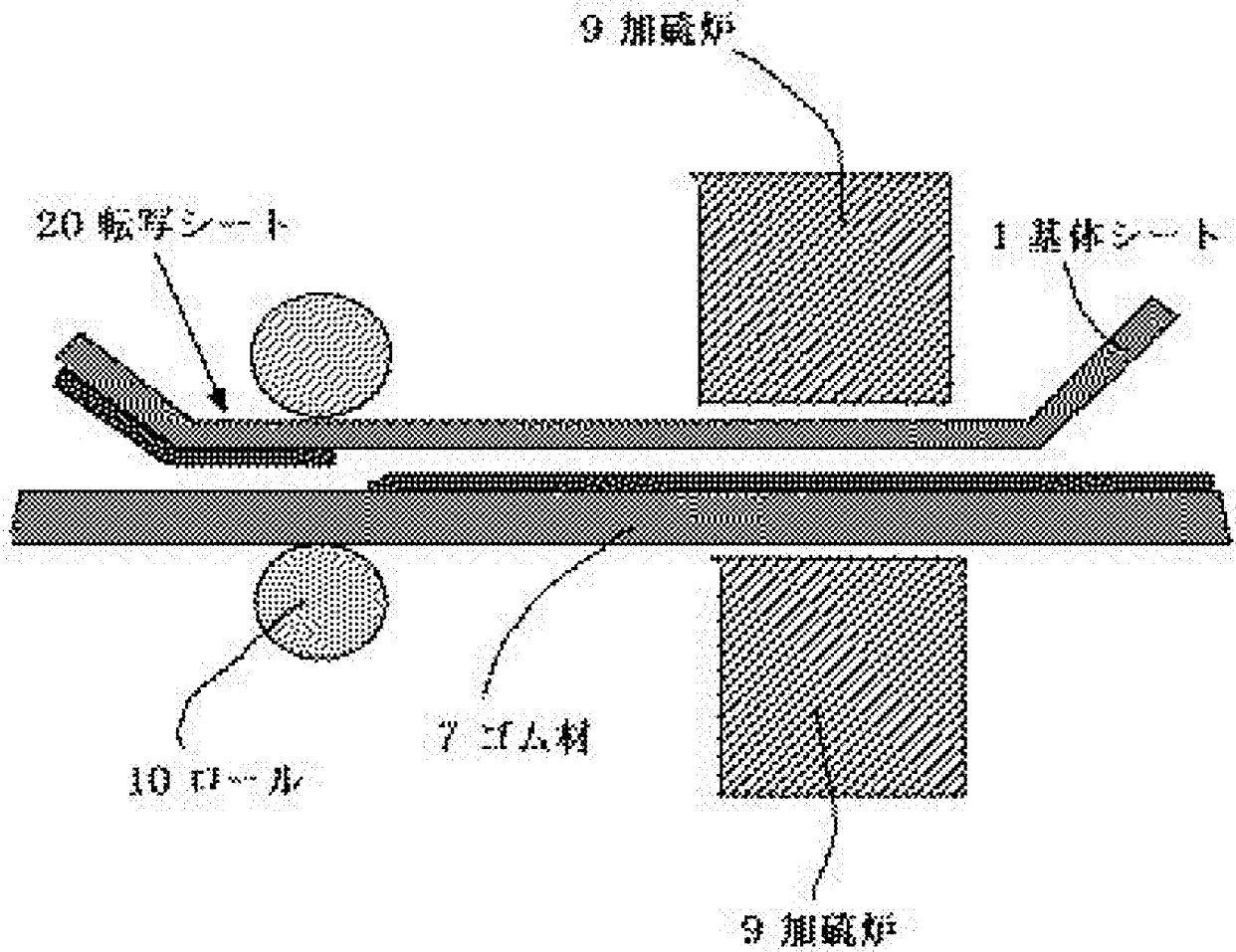
[FIG.1]



[FIG.2]



[FIG. 3]



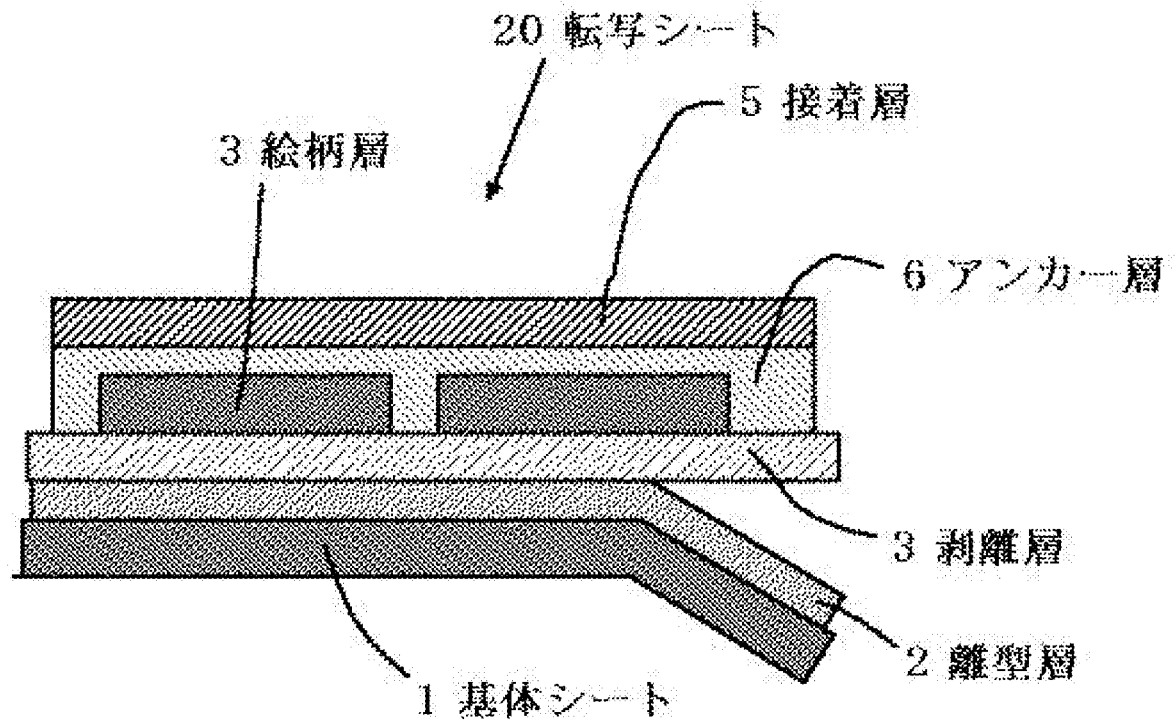
Drawings

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Representative drawing | 1 | 2 | 3

Enlarge and Rotate

>



Representative drawing

< 1 of 1 Display >

Electronic Acknowledgement Receipt

EFS ID:	39487048
Application Number:	16201903
International Application Number:	
Confirmation Number:	1052
Title of Invention:	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES
First Named Inventor/Applicant Name:	Keith George Ferry
Customer Number:	125632
Filer:	Grant T. Langton/Lauren Coyle
Filer Authorized By:	Grant T. Langton
Attorney Docket Number:	67838.00217
Receipt Date:	19-MAY-2020
Filing Date:	27-NOV-2018
Time Stamp:	21:03:31
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment		no			
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Foreign Reference	JP2014213718.pdf	25032183	no	32
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Warnings:					

Information:					
2	Foreign Reference	JP2004299201.pdf	10351769	no	16
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Information:					
4	Foreign Reference	JPH05338032.pdf	10920693	no	12
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5	Information Disclosure Statement (IDS) Form (SB08)	051920_IDS_as_filed_67838_0217.pdf	1034710	no	4
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EFS ID:	38145485
Application Number:	16201903
International Application Number:	
Confirmation Number:	1052
Title of Invention:	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES
First Named Inventor/Applicant Name:	Keith George Ferry
Customer Number:	125632
Filer:	Grant T. Langton/Lauren Coyle
Filer Authorized By:	Grant T. Langton
Attorney Docket Number:	67838.00217
Receipt Date:	26-DEC-2019
Filing Date:	27-NOV-2018
Time Stamp:	23:19:33
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	Other Reference-Patent/App/Search documents	WO2016176353-WOSA-20161103-1833.pdf	238763 8c0bbc492c3e05319f5a2b57b7e49daf57a0c111	no	6

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2	Other Reference-Patent/App/Search documents	WO2016176353-IPRP1-20171031-8313.pdf	275451	no	7
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3	Other Reference-Patent/App/Search documents	WO2016176353-ISR-20161103-7976.pdf	139862	no	5
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4	Other Reference-Patent/App/Search documents	101019-Full-AU-Examination-Report-67838_00201.pdf	226138	no	6
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5	Other Reference-Patent/App/Search documents	040518_NFOA_67838_00200.pdf	1488455	no	28
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7	Information Disclosure Statement (IDS) Form (SB08)	122619_IDS_as_filed_67838_00217.pdf	1035388	no	5
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Total Files Size (in bytes):			3762051		

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(Not for submission under 37 CFR 1.99)

Application Number	16201903
Filing Date	2018-11-27
First Named Inventor	Keith George Ferry
Art Unit	1762
Examiner Name	Fred M. Teskin
Attorney Docket Number	67838.00217

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	2	4461795	A	1984-07-24	Ogawa	
	3	5198301	A	1993-03-30	Hager et al.	
	4	5300164	A	1994-04-05	DeTrano et al.	
	5	6030676	A	2000-02-29	Cottin et al.	
	6	5508084	A	1996-04-16	Reeves et al.	
	7	6080465	A	2000-06-27	Boissonnet et al.	
	8	6235376	B1	2001-05-22	Miyazaki et al.	

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Examiner Name	Fred M. Teskin
Attorney Docket Number	67838.00217

9	6391134	B1	2002-05-21	Lipovac
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1		International Search Report dated July 27, 2016 for corresponding International Application No. PCT/US2016/029605 filed April 27, 2016; total 5 pages.	

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	16201903
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First Named Inventor	Keith George Ferry
Art Unit	1762
Examiner Name	Fred M. Teskin
Attorney Docket Number	67838.00217

2	Written Opinion of the International Searching Authority dated July 27, 2016 for corresponding International Application No. PCT/US2016/029605 filed April 27, 2016; total 6 pages.
3	International Preliminary Report on Patentability dated October 31, 2017 for corresponding International Application No. PCT/US2016/029605 filed April 27, 2016; total 7 pages.
4	Non-Final Office Action dated April 5, 2018 in corresponding U.S. Application No. 15/139,272 filed April 26, 2016; total 28 pages.
5	Notice of Allowance dated September 24, 2018 in corresponding U.S. Application No. 15/139,272 filed April 26, 2016; total 5 pages.
6	Examination Report dated October 10, 2019 in corresponding Australian Application No. 2016255775 filed November 27, 2017; total 6 pages.

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STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	16201903
Filing Date	2018-11-27
First Named Inventor	Keith George Ferry
Art Unit	1762
Examiner Name	Fred M. Teskin
Attorney Docket Number	67838.00217

CERTIFICATION STATEMENT

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

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

OR

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

See attached certification statement.

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

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Grant T. Langton/	Date (YYYY-MM-DD)	2019-12-26
Name/Print	Grant T. Langton	Registration Number	39,739

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

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

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

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

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 67838-00216	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/US2016/029605	International filing date (<i>day/month/year</i>) 27 April 2016 (27-04-2016)	(Earliest) Priority Date (<i>day/month/year</i>) 27 April 2015 (27-04-2015)
Applicant FERRY, KEITH GEORGE		

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

This international search report consists of a total of 5 sheets.

☒

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

1. Basis of the report

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

☒

the international application in the language in which it was filed

☐

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

b. ☐

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

c. ☐

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

2. ☐

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

3. ☐

Unity of invention is lacking (see Box No III)

4. With regard to the **title**,

☒

the text is approved as submitted by the applicant

☐

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

5. With regard to the **abstract**,

☐

the text is approved as submitted by the applicant

☒

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

6. With regard to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No. 1

☒

as suggested by the applicant

☐

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

☐

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

b. ☐

none of the figures is to be published with the abstract

Box No. IV Text of the abstract (Continuation of item 5 of the first sheet)

Display assemblies (10) as disclosed herein are configured for attachment with a vulcanized rubber article (12) and are provided in the form of different material layers. Display assemblies generally comprise one or more display layers of elastomeric material configured to provide a desired display indicia, an intermediate layer formed from an elastomeric material different from that of the one or more display layers, and an adhesive layer wherein the intermediate layer is interposed between the adhesive layer and the one or more display layers. The one more display layers may be configured to act together or separately to provide a desired display indicia to provide a desired visual display or feature on the surface of the vulcanized rubber article, which may be a sidewall surface (14) of a tire (12).

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2016/029605

A. CLASSIFICATION OF SUBJECT MATTER

INV. B44C1/16 B60C13/00
ADD.

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B44C B60C

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

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

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 300 164 A (DETRANO MARIO N [US] ET AL) 5 April 1994 (1994-04-05)	1-3, 10-15, 17-20
Y	the whole document	6-9, 16
X	US 4 461 795 A (OGAWA MASAKI [JP]) 24 July 1984 (1984-07-24)	1, 4, 5, 11, 14, 15, 18, 19
Y	the whole document	
Y	US 2005/059308 A1 (PARSONS EDWIN D [US]) 17 March 2005 (2005-03-17)	7-9
A	paragraphs [0001], [0008], [0013] - [0019]; figures 2, 3	1, 11, 18-20
	----- -/-	

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

* Special categories of cited documents :

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

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

14 July 2016

Date of mailing of the international search report

27/07/2016

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Björklund, Sofie

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2016/029605

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	US 6 235 376 B1 (MIYAZAKI TOSHIHIKO [JP] ET AL) 22 May 2001 (2001-05-22) the whole document -----	6,16 1-3,10, 14,15, 18-20

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2016/029605

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5300164	A	05-04-1994	CA 2088896 A1	08-08-1993
			JP 3240208 B2	17-12-2001
			JP H05338032 A	21-12-1993
			US 5300164 A	05-04-1994

US 4461795	A	24-07-1984	NONE	

US 2005059308	A1	17-03-2005	NONE	

US 6235376	B1	22-05-2001	DE 69710844 D1	11-04-2002
			DE 69710844 T2	26-09-2002
			EP 0841650 A2	13-05-1998
			ES 2170920 T3	16-08-2002
			US 6235376 B1	22-05-2001

Form PCT/ISA/210 (patent family annex) (April 2005)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2016/029605

International filing date (day/month/year)
27.04.2016

Priority date (day/month/year)
27.04.2015

International Patent Classification (IPC) or both national classification and IPC
INV. B44C1/16 B60C13/00

Applicant
FERRY, KEITH GEORGE

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

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

2. FURTHER ACTION

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

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

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0
Fax: +49 89 2399 - 4465

Date of completion of
this opinion

see form
PCT/ISA/210

Authorized Officer

Björklund, Sofie
Telephone No. +49 89 2399-0



Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed.
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))
3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
 - a. ☐ forming part of the international application as filed:
 - ☐ in the form of an Annex C/ST.25 text file.
 - ☐ on paper or in the form of an image file.
 - b. ☐ furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. ☐ furnished subsequent to the international filing date for the purposes of international search only:
 - ☐ in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).
 - ☐ on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).
4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

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

1. Statement

Novelty (N)	Yes: Claims	<u>2, 3, 5-10, 13, 16, 17, 20</u>
	No: Claims	<u>1, 4, 11, 12, 14, 15, 18, 19</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-20</u>
Industrial applicability (IA)	Yes: Claims	<u>1-20</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

1 Reference is made to the following documents:

- D1 US 5 300 164 A
- D2 US 4 461 795 A
- D3 US 2005/059308 A1
- D4 US 6 235 376 B1

2 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of independent claims 1, 11 and 19 is not new in the sense of Article 33(2) PCT.

2.1 D1 discloses (cf. claim 1) a display assembly (applique 20) for attachment with a vulcanized rubber article (col. 1, l. 7-12) comprising:
one or more display layers (21) of elastomeric material configured to provide a display indicia (col. 3, l. 21 - col. 4, l. 20);
an intermediate layer (22) formed from an elastomeric material that is different from that of the one or more display layers (col.4, l. 22-53); and
an adhesive layer (24), wherein the intermediate layer is interposed between the adhesive layer and the one or more display layers (fig. 3), the adhesive layer being formed from a material capable of chemically bonding with a surface of a vulcanized rubber article (col. 5, l. 46 - col. 6, l. 10).

D1 also discloses (cf. claim 11) a method for attaching a display assembly (20) to a surface (12) of a vulcanized rubber article (10) comprising the steps of; preparing a surface of a vulcanized rubber article by cleaning the surface (col. 7, l. 43-45); applying an adhesive material (24) to form an adhesive layer (col. 7, l. 51-52); placing a display assembly (20) into contact the surface with the adhesive layer interposed therebetween to form a bond between the display assembly and surface (col. 7, l. 52-54), the display assembly comprising:
one or more display layers (21) of elastomeric material constructed to provide a display indicia (col. 3, l. 21 - col. 4, l. 20); and
an intermediate layer (22) formed from an elastomeric material that is different from that of the one or more display layers (col.4, l. 22-53); wherein

the intermediate layer is interposed between the adhesive layer and the one or more display layers (fig. 3), the adhesive layer (24) being formed from a material capable of chemically bonding the display assembly to the surface of the vulcanized rubber article(col. 5, l. 46 - col. 6, l. 10).

D1 further discloses (cf. claim 19) a vulcanized rubber tire (10) comprising: a target surface (12) disposed along a portion of the rubber tire; a display assembly (20) disposed onto the target surface and comprising: a display layer (21) of elastomeric material (col. 3, l. 21 - col. 4, l. 20); an intermediate layer (22) formed from an elastomeric material different from that of the one or more display layers (col.4, l. 22-53); and an adhesive layer (24) interposed between the target surface and the intermediate layer bonding the display assembly to the target surface (fig. 3).

The subject-matter of independent claims 1, 11 and 19 is therefore not novel.

- 2.2 D2 also discloses the subject-matter of claims 1, 11 and 19. Herein, the display assembly comprises a display layer of chromatic rubber (2), a barrier layer (4), a shock-absorbing rubber layer (5) and an adhesive layer (6). Either one of the barrier layer (4) and the shock-absorbing rubber layer (5) can be seen as the claimed intermediate layer. It is noted that the barrier layer is preferably made of elastic nylon copolymer (col. 4, l. 39-45) which is considered as an elastomeric material in the sense of the present application.

- 3 The dependent claims do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, the reasons being as follows:

- 3.1 D1 (col. 3, l. 21-31) discloses the possibility of more than one display layer. In particular, D1 (col. 3, l. 42-44) foresees that the display layer 21 is provided with a plurality of colours, designs, markings or lettering. It would be an obvious alternative to the skilled person to provide such decoration by means of applying (e.g. printing) a layer on top of the layer 21, such additional layer having a different colour than layer 21 and not completely covering layer 21. The subject-matter of claims 2, 3, 10 and 20 is thus rendered obvious by the disclosure of D1. Another obvious alternative would be to add the additional layer by means of an adhesive, such that the subject-matter of claim 17 also does not involve an inventive step.

D1 (col. 7, l. 43-55) furthermore discloses the additional features of claims 12, 14, 15 and 18, the subject-matter of these claims is therefore not novel.

D1 (col. 7, l. 51-55) discloses that the adhesive is applied to the tire before the display assembly is added thereto, the use of a template to facilitate the positioning of the adhesive is an obvious alternative to the skilled person, such that the subject-matter of claim 13 does not involve an inventive step.

- 3.2 D2 (col. 5, l. 63 - col. 6, l. 6) discloses the use of an intermediate adhesive layer (3) interposed between the display layer (2) and the intermediate layer (4), the subject-matter of claims 4 and 5 is thus disclosed or at least rendered obvious.

In addition, D2 (col. 5, l. 60 - col. 6, l. 14 and col. 7, l. 48-60) discloses the subject-matter of claims 14, 15 and 18.

- 3.3 The purpose of the cavity defined in claim 7 appears to be to accept an element (e.g. a RFID element, see p. 17, l. 3-5) therein, as defined in claim 8. It is however known from D3 (par. 1, 8, 13-19 and fig. 2 and 3) to integrate a RFID element (24) in a label for mounting on a surface of a tire, wherein the element is positioned in a cavity formed in the adhesive layer (22) beneath the display layer (20). It would be obvious to the skilled person, wanting to include an element such as a RFID element in the label according to D1, to apply the teaching of D3, thus arriving at the subject-matter of claims 7-9.

- 3.4 The use of a protective layer (12) in a display assembly (10) as well as a transfer carrier (20) for applying the display assembly to the sidewall surface (40) of a rubber tire (42) is disclosed in D4 (col. 9, l. 1-45). It would be obvious to the skilled person to apply the teaching of D4 to the arrangement of D1, thus arriving at the subject-matter of claims 6 and 16

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference 67838-00216	FOR FURTHER ACTION	See item 4 below
International application No. PCT/US2016/029605	International filing date (<i>day/month/year</i>) 27 April 2016 (27.04.2016)	Priority date (<i>day/month/year</i>) 27 April 2015 (27.04.2015)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant FERRY, Keith George		

1.	This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).																								
2.	This REPORT consists of a total of 7 sheets, including this cover sheet. In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.																								
3.	This report contains indications relating to the following items: <table style="width: 100%;"> <tr> <td style="width: 10%; text-align: center;">☒</td> <td style="width: 30%;">Box No. I</td> <td style="width: 80%;">Basis of the report</td> </tr> <tr> <td style="text-align: center;">☐</td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td style="text-align: center;">☐</td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td style="text-align: center;">☐</td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td style="text-align: center;">☒</td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td style="text-align: center;">☐</td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td style="text-align: center;">☐</td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td style="text-align: center;">☐</td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table>	☒	Box No. I	Basis of the report	☐	Box No. II	Priority	☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	☐	Box No. IV	Lack of unity of invention	☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	☐	Box No. VI	Certain documents cited	☐	Box No. VII	Certain defects in the international application	☐	Box No. VIII	Certain observations on the international application
☒	Box No. I	Basis of the report																							
☐	Box No. II	Priority																							
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☐	Box No. VI	Certain documents cited																							
☐	Box No. VII	Certain defects in the international application																							
☐	Box No. VIII	Certain observations on the international application																							
4.	The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).																								

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70	Date of issuance of this report 31 October 2017 (31.10.2017) Authorized officer Lingfei Bai e-mail: pct.team2@wipo.int
--	--

Form PCT/IB/373 (January 2004)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2016/029605

International filing date (day/month/year)
27.04.2016

Priority date (day/month/year)
27.04.2015

International Patent Classification (IPC) or both national classification and IPC
INV. B44C1/16 B60C13/00

Applicant
FERRY, KEITH GEORGE

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

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

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

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0
Fax: +49 89 2399 - 4465

Date of completion of
this opinion

see form
PCT/ISA/210

Authorized Officer

Björklund, Sofie

Telephone No. +49 89 2399-0



Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed.
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))
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 - a. ☐ forming part of the international application as filed:
 - ☐ in the form of an Annex C/ST.25 text file.
 - ☐ on paper or in the form of an image file.
 - b. ☐ furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. ☐ furnished subsequent to the international filing date for the purposes of international search only:
 - ☐ in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).
 - ☐ on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).
4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

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

1. Statement

Novelty (N)	Yes: Claims	<u>2, 3, 5-10, 13, 16, 17, 20</u>
	No: Claims	<u>1, 4, 11, 12, 14, 15, 18, 19</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-20</u>
Industrial applicability (IA)	Yes: Claims	<u>1-20</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

1 Reference is made to the following documents:

D1 US 5 300 164 A

D2 US 4 461 795 A

D3 US 2005/059308 A1

D4 US 6 235 376 B1

2 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of independent claims 1, 11 and 19 is not new in the sense of Article 33(2) PCT.

2.1 D1 discloses (cf. claim 1) a display assembly (applique 20) for attachment with a vulcanized rubber article (col. 1, l. 7-12) comprising:
one or more display layers (21) of elastomeric material configured to provide a display indicia (col. 3, l. 21 - col. 4, l. 20);
an intermediate layer (22) formed from an elastomeric material that is different from that of the one or more display layers (col.4, l. 22-53); and
an adhesive layer (24), wherein the intermediate layer is interposed between the adhesive layer and the one or more display layers (fig. 3), the adhesive layer being formed from a material capable of chemically bonding with a surface of a vulcanized rubber article (col. 5, l. 46 - col. 6, l. 10).

D1 also discloses (cf. claim 11) a method for attaching a display assembly (20) to a surface (12) of a vulcanized rubber article (10) comprising the steps of; preparing a surface of a vulcanized rubber article by cleaning the surface (col. 7, l. 43-45); applying an adhesive material (24) to form an adhesive layer (col. 7, l. 51-52); placing a display assembly (20) into contact the surface with the adhesive layer interposed therebetween to form a bond between the display assembly and surface (col. 7, l. 52-54), the display assembly comprising:
one or more display layers (21) of elastomeric material constructed to provide a display indicia (col. 3, l. 21 - col. 4, l. 20); and
an intermediate layer (22) formed from an elastomeric material that is different from that of the one or more display layers (col.4, l. 22-53); wherein

the intermediate layer is interposed between the adhesive layer and the one or more display layers (fig. 3), the adhesive layer (24) being formed from a material capable of chemically bonding the display assembly to the surface of the vulcanized rubber article(col. 5, l. 46 - col. 6, l. 10).

D1 further discloses (cf. claim 19) a vulcanized rubber tire (10) comprising: a target surface (12) disposed along a portion of the rubber tire; a display assembly (20) disposed onto the target surface and comprising: a display layer (21) of elastomeric material (col. 3, l. 21 - col. 4, l. 20); an intermediate layer (22) formed from an elastomeric material different from that of the one or more display layers (col.4, l. 22-53); and an adhesive layer (24) interposed between the target surface and the intermediate layer bonding the display assembly to the target surface (fig. 3).

The subject-matter of independent claims 1, 11 and 19 is therefore not novel.

- 2.2 D2 also discloses the subject-matter of claims 1, 11 and 19. Herein, the display assembly comprises a display layer of chromatic rubber (2), a barrier layer (4), a shock-absorbing rubber layer (5) and an adhesive layer (6). Either one of the barrier layer (4) and the shock-absorbing rubber layer (5) can be seen as the claimed intermediate layer. It is noted that the barrier layer is preferably made of elastic nylon copolymer (col. 4, l. 39-45) which is considered as an elastomeric material in the sense of the present application.

- 3 The dependent claims do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, the reasons being as follows:

- 3.1 D1 (col. 3, l. 21-31) discloses the possibility of more than one display layer. In particular, D1 (col. 3, l. 42-44) foresees that the display layer 21 is provided with a plurality of colours, designs, markings or lettering. It would be an obvious alternative to the skilled person to provide such decoration by means of applying (e.g. printing) a layer on top of the layer 21, such additional layer having a different colour than layer 21 and not completely covering layer 21. The subject-matter of claims 2, 3, 10 and 20 is thus rendered obvious by the disclosure of D1. Another obvious alternative would be to add the additional layer by means of an adhesive, such that the subject-matter of claim 17 also does not involve an inventive step.

D1 (col. 7, l. 43-55) furthermore discloses the additional features of claims 12, 14, 15 and 18, the subject-matter of these claims is therefore not novel.

D1 (col. 7, l. 51-55) discloses that the adhesive is applied to the tire before the display assembly is added thereto, the use of a template to facilitate the positioning of the adhesive is an obvious alternative to the skilled person, such that the subject-matter of claim 13 does not involve an inventive step.

- 3.2 D2 (col. 5, l. 63 - col. 6, l. 6) discloses the use of an intermediate adhesive layer (3) interposed between the display layer (2) and the intermediate layer (4), the subject-matter of claims 4 and 5 is thus disclosed or at least rendered obvious.

In addition, D2 (col. 5, l. 60 - col. 6, l. 14 and col. 7, l. 48-60) discloses the subject-matter of claims 14, 15 and 18.

- 3.3 The purpose of the cavity defined in claim 7 appears to be to accept an element (e.g. a RFID element, see p. 17, l. 3-5) therein, as defined in claim 8. It is however known from D3 (par. 1, 8, 13-19 and fig. 2 and 3) to integrate a RFID element (24) in a label for mounting on a surface of a tire, wherein the element is positioned in a cavity formed in the adhesive layer (22) beneath the display layer (20). It would be obvious to the skilled person, wanting to include an element such as a RFID element in the label according to D1, to apply the teaching of D3, thus arriving at the subject-matter of claims 7-9.

- 3.4 The use of a protective layer (12) in a display assembly (10) as well as a transfer carrier (20) for applying the display assembly to the sidewall surface (40) of a rubber tire (42) is disclosed in D4 (col. 9, l. 1-45). It would be obvious to the skilled person to apply the teaching of D4 to the arrangement of D1, thus arriving at the subject-matter of claims 6 and 16



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/201,903	11/27/2018	Keith George Ferry	67838.00217

CONFIRMATION NO. 1052

PUBLICATION NOTICE



0000000108723969

125632
Snell & Wilmer (LA)
400 East Van Buren Street
One Arizona Center
Phoenix, AZ 85004

Title: DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES

Publication No. US-2019-0168547-A1

Publication Date: 06/06/2019

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.

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
16/201,903	11/27/2018	2871	1295	67838.00217	24	4

CONFIRMATION NO. 1052
UPDATED FILING RECEIPT



0000000106082276

125632
Snell & Wilmer (LA)
400 East Van Buren Street
One Arizona Center
Phoenix, AZ 85004

Date Mailed: 02/26/2019

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)

Keith George Ferry, Studio City, CA;
Jason Michael Busch, Studio City, CA;

Applicant(s)

Keith George Ferry, Studio City, CA;
Jason Michael Busch, Studio City, CA;

Power of Attorney: The patent practitioners associated with Customer Number 125632

Domestic Priority data as claimed by applicant

This application is a CON of 15/139,272 04/26/2016 PAT 10137741
which claims benefit of 62/153,441 04/27/2015

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: 12/17/2018

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/201,903**

Projected Publication Date: 06/06/2019

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES

Preliminary Class

349

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.

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PATENT APPLICATION FEE DETERMINATION RECORD						Application or Docket Number				
Substitute for Form PTO-875						16/201,903				
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 (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	75		N/A			
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	330		N/A			
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	380		N/A			
TOTAL CLAIMS (37 CFR 1.16(i))	24	minus 20 =	* 4	x 50 =	200	OR				
INDEPENDENT CLAIMS (37 CFR 1.16(h))	4	minus 3 =	* 1	x 230 =	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	1215	TOTAL		
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 (37 CFR 1.16(i))	*	Minus	**	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee (37 CFR 1.16(s))							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
TOTAL ADD'L FEE								OR	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 (37 CFR 1.16(i))	*	Minus	**	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee (37 CFR 1.16(s))							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
TOTAL ADD'L FEE								OR	TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.										
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".										
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".										
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.										

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.:	16/201,903	Confirmation No.:	1052
Inventor(s):	Keith George Ferry et al.	Group Art Unit:	2871
Filed:	November 27, 2018	Examiner:	To Be Assigned
Title:	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES	Docket No.	67838.00217

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

RESPONSE TO NOTICE TO FILE MISSING PARTS

Dear Commissioner:

In response to the Notice to File Missing Parts of Non-Provisional Application dated December 19, 2018, Applicant respectfully submits herewith replacement drawings FIG(s)1 to 8H to replace the drawings previously submitted on November 27, 2018. The replacement drawings are reasonably free from erasures, alterations, overwriting, interlineations, folds, and copy marks in compliance with 37 CFR 1.84 and 37 CFR 1.121(d). Applicant further submits a Preliminary Amendment in response to the Notice to File missing Parts (which Notice listed filing fees in the amount of \$865 based on the initially filed claims). In the Preliminary Amendment, Applicant has cancelled claims 13, 15-17, and 20 of the initially filed claims and has added new claims 21-29, with the total fees now due and paid for \$1,295. No new matter is being introduced with this submission.

The Commissioner is authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm), and to credit any overpayment, to Deposit Account No. 19-2814.

Respectfully submitted,

Date: February 19, 2019

CUSTOMER NUMBER

125632

/ Grant T. Langton/

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Amendments to the Claims

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

Listing of the Claims:

1. (Currently Amended) ~~A display~~ An assembly for attachment with a vulcanized rubber article comprising:
~~one or more display layers~~ an outer layer of elastomeric material having ~~configured to provide a visual feature display indicia~~; and
an adhesive layer adhered to an interface surface of the outer layer ~~one or more display layers~~, wherein one or both ~~more~~ of the outer display layer or the adhesive layer has a barrier material composition ~~that acts as a barrier to impair the migration of material constituents from the adhesive layer to a surface layer of the display layer~~, and wherein the adhesive layer is formed from a material capable of chemically bonding with a surface of a vulcanized rubber article.
2. (Currently Amended) The ~~display~~ assembly as recited in claim 1 wherein the outer layer comprises ~~comprising~~ a first ~~display~~ layer and a second ~~display~~ layer disposed beneath the first ~~display~~ layer.
3. (Currently Amended) The ~~display~~ assembly as recited in claim 2 wherein the first ~~display~~ layer is colored differently from the second ~~display~~ layer.
4. (Currently Amended) The ~~display~~ assembly as recited in claim 1 further comprising an intermediate layer interposed between the outer layer ~~one or more display layers~~ and the adhesive layer.
5. (Currently Amended) The ~~display~~ assembly as recited in claim 1 therein the barrier material composition impairs migration of a material constituent within the assembly ~~4 further comprising an intermediate adhesive layer interposed between the one or more display layers and the intermediate layer~~.

6. (Currently Amended) The ~~display~~ assembly as recited in claim 1 further comprising a protective layer disposed over the outer layer ~~one or more display layers~~ and forming an outermost surface of the ~~display~~ assembly, the protective layer formed from an optically transparent material.
7. (Currently Amended) The ~~display~~ assembly as recited in claim 1 further comprising a cavity disposed therein.
8. (Currently Amended) The ~~display~~ assembly as recited in claim 7 further comprising an element disposed within the cavity.
9. (Currently Amended) The ~~display~~ assembly as recited in claim 1 wherein the cavity is disposed beneath the outer layer ~~one or more display layers~~.
10. (Currently Amended) The ~~display~~ assembly as recited in claim 2 wherein the first ~~display~~ layer includes one or more openings therethrough, and wherein the second ~~display~~ layer is visible through the one or more openings.
11. (Currently Amended) A method for attaching an a ~~a~~ display assembly to a surface of a vulcanized rubber article comprising the steps of;
~~preparing~~ identifying a surface of a vulcanized rubber article ~~by cleaning the surface;~~
~~applying an adhesive material to form an adhesive layer;~~
placing an a ~~a~~ display assembly into contact with the identified surface, ~~surface with the adhesive layer interposed therebetween to form a bond between the display assembly and surface, wherein the display assembly comprises comprising:~~
an outer ~~one or more display layers~~ layer of elastomeric material ~~constructed to provide a display indicia, wherein one of the display layers having an interface surface~~ the outer layer is in contact with the an adhesive layer interposed between the prepared surface assembly that bonds the assembly to the vulcanized rubber article, wherein one of the outer layer or adhesive layer comprises a barrier material composition that acts as a barrier to impair the migration of material constituents from the adhesive layer to a surface layer of the one or more display layers.

12. (Currently Amended) The method as recited in claim 11 further comprising preparing ~~treating~~ the identified surface ~~to roughen the surface~~ before the step of placing.
13. (Cancelled)
14. (Currently Amended) The method as recited in claim 11 further comprising applying pressure to the ~~display~~ assembly after the step of placing.
15. (Cancelled)
16. (Cancelled)
17. (Cancelled)
18. (Currently Amended) The method as recited in claim 11 wherein the vulcanized rubber article is tire, ~~and~~ wherein the surface is a sidewall surface of the tire, and wherein the assembly includes a cavity disposed therein for accommodating placement of an element.
19. (Currently Amended) A vulcanized rubber tire comprising:
a target surface disposed along a portion of the rubber tire;
~~a display~~ an assembly disposed onto the target surface and comprising:
 ~~a display~~ an outer layer of elastomeric material; and
 an adhesive layer connected with ~~attached to an interface surface of the~~ outer ~~display~~ layer;
wherein one of the ~~display~~ outer layer or the adhesive layer comprises a barrier material composition ~~that acts as a barrier to impair migration of material constituents from the adhesive layer to an outer surface of the display layer.~~
20. (Cancelled)

21. (New) The rubber tire as recited in claim 19 wherein the assembly further comprises a cavity disposed therein.
22. (New) The rubber tire as recited in claim 21 wherein an element is disposed within the cavity.
23. (New) The rubber tire as recited in claim 21 wherein the cavity is disposed beneath the outer layer.
24. (New) An assembly for attachment to a vulcanized rubber tire comprising;
an outer layer formed from an elastomeric material;
an adhesive layer bonding the assembly to portion of a vulcanized elastomeric material;
and
a cavity disposed within the assembly for accommodating an element therein.
25. (New) The assembly as recited in claim 24 wherein at least a portion of the cavity is disposed beneath the outer layer.
26. (New) The assembly as recited in claim 24 wherein the adhesive layer is connected with the outer layer.
27. (New) The assembly as recited in claim 24 wherein the outer layer includes an indicia along an outer surface.
28. (New) The assembly as recited in claim 24 wherein one of the outer layer or adhesive layer comprises a barrier material composition.
29. (New) The assembly as recited in claim 24 further comprising an intermediate layer disposed beneath the outer layer.

Electronic Patent Application Fee Transmittal				
Application Number:		16201903		
Filing Date:		27-Nov-2018		
Title of Invention:		DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES		
First Named Inventor/Applicant Name:		Keith George Ferry		
Filer:		Grant T. Langton/Lauren Coyle		
Attorney Docket Number:		67838.00217		
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
INDEPENDENT CLAIMS IN EXCESS OF 3	2201	1	230	230
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
LATE FILING FEE FOR OATH OR DECLARATION	2051	1	80	80
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1295

Electronic Acknowledgement Receipt

EFS ID:	35195368
Application Number:	16201903
International Application Number:	
Confirmation Number:	1052
Title of Invention:	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES
First Named Inventor/Applicant Name:	Keith George Ferry
Customer Number:	125632
Filer:	Grant T. Langton/Lauren Coyle
Filer Authorized By:	Grant T. Langton
Attorney Docket Number:	67838.00217
Receipt Date:	19-FEB-2019
Filing Date:	27-NOV-2018
Time Stamp:	20:05:52
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$ 1295
RAM confirmation Number	022019INTEFSW00007095192814
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	021919_RMP_as_filed_67838_00217.pdf	81861	no	2
			95d15ffd284fea7948d5e870a73be5dcb7f82f93		
Warnings:					
Information:					
2		021919_PA_as_filed_67838_00217.pdf	98169	yes	6
			9ca57dea4384e329093b40ec577e3e5b8790c1cf		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Preliminary Amendment		1	1	
	Claims		2	5	
	Applicant Arguments/Remarks Made in an Amendment		6	6	
Warnings:					
Information:					
3	Drawings-only black and white line drawings	021919_Replacement_FIGS_as_filed_67838_00217.pdf	1568940	no	8
			78e9d5cdc9233af19c84243d56707bfda1024e17		
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	40397	no	2
			e87694ab46b7734d37f015b8ea79f6d93b78fadb		
Warnings:					
Information:					
Total Files Size (in bytes):			1789367		

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.

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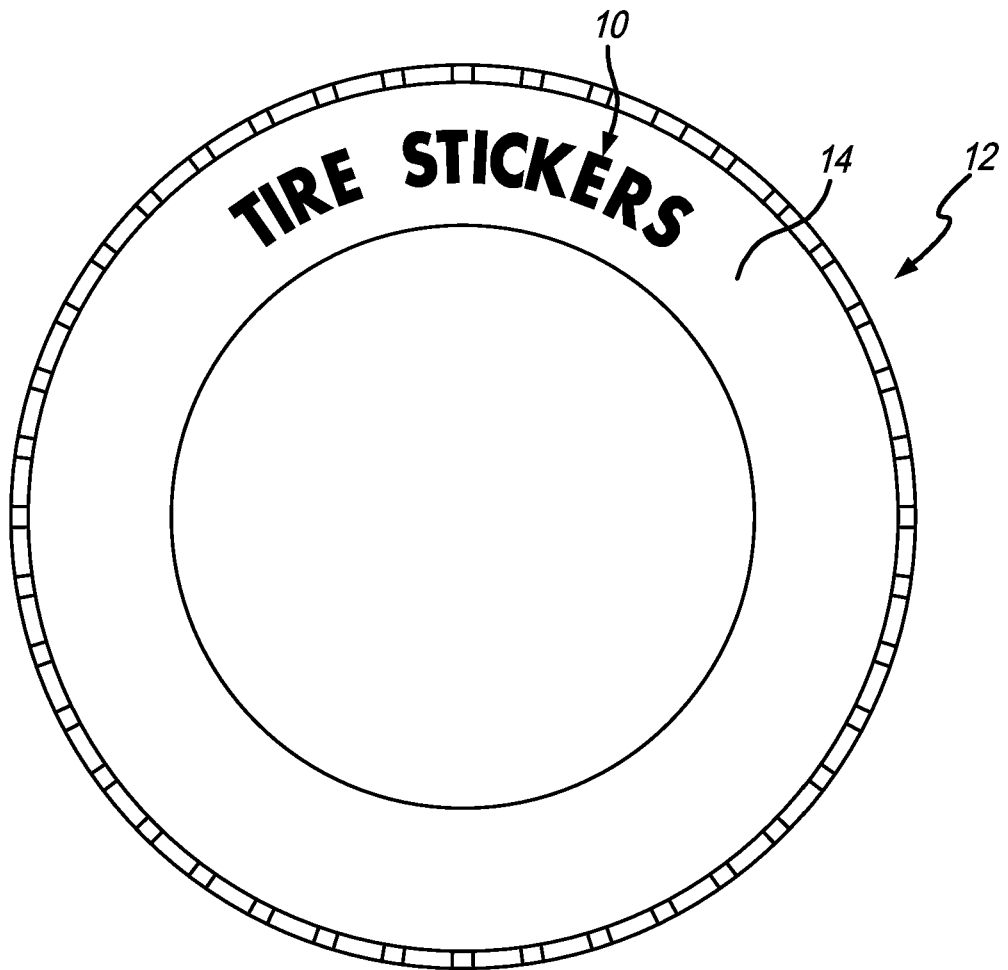
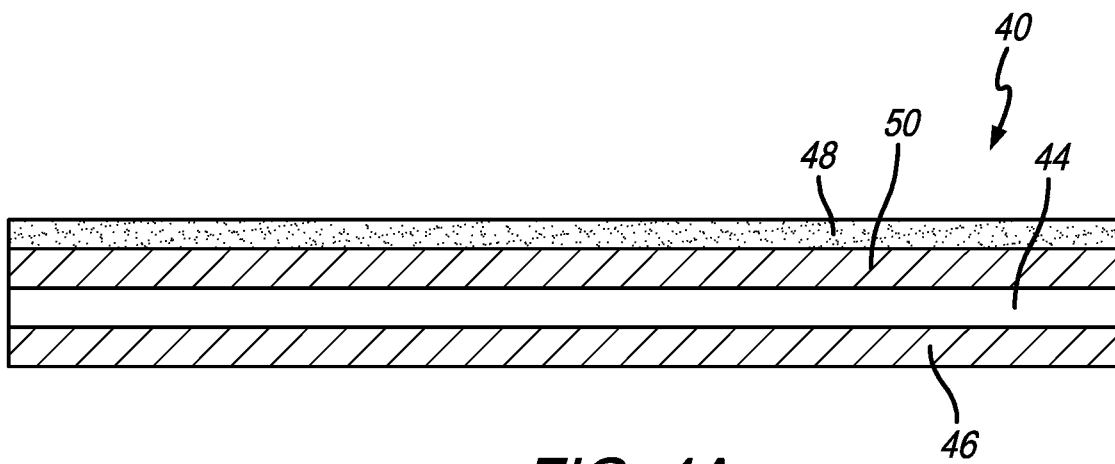
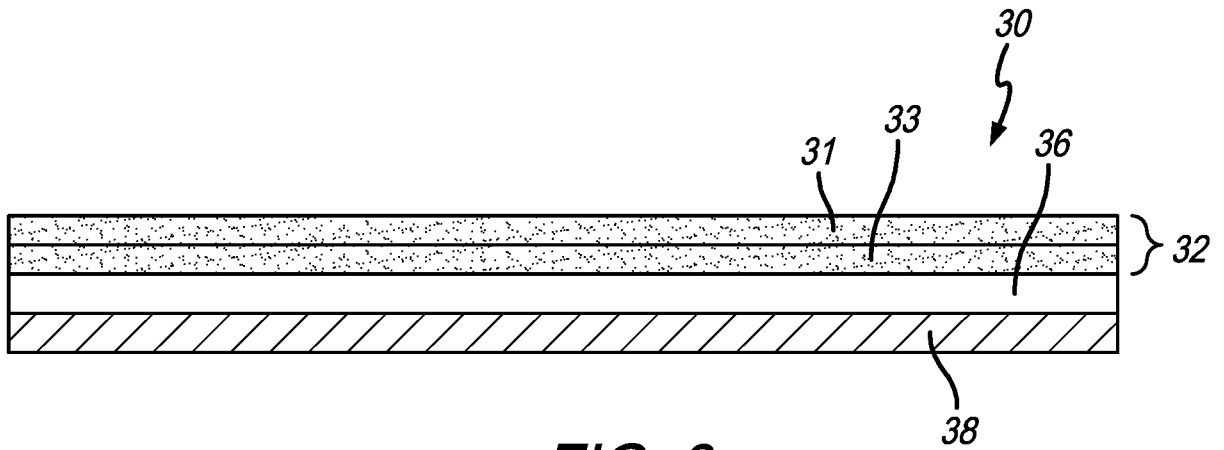
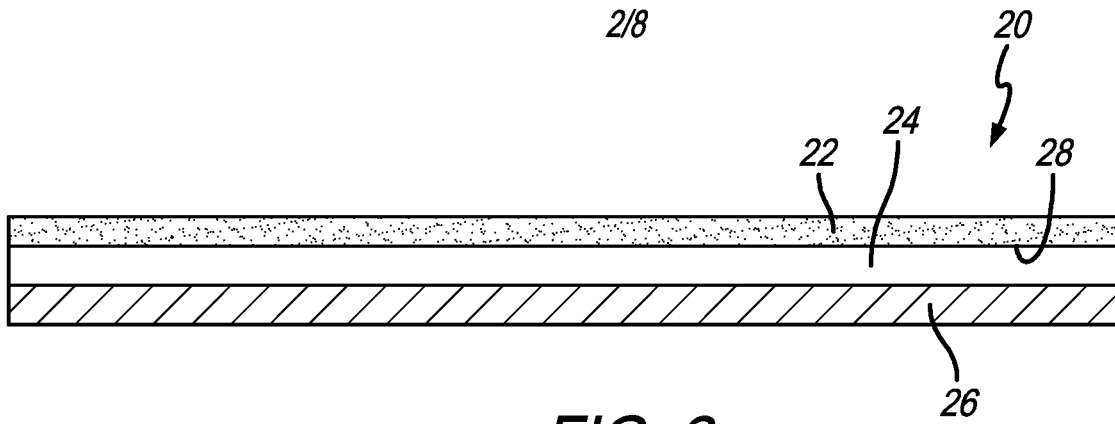


FIG. 1



REPLACEMENT SHEET

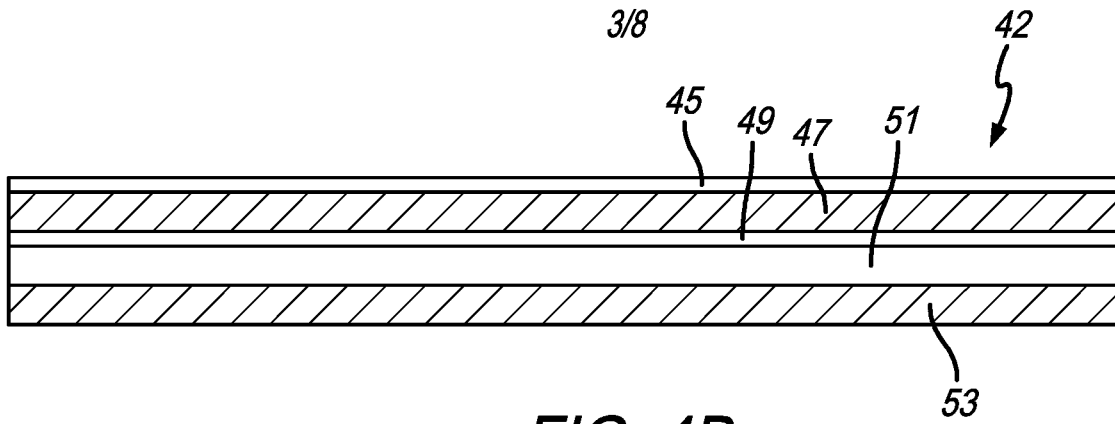


FIG. 4B

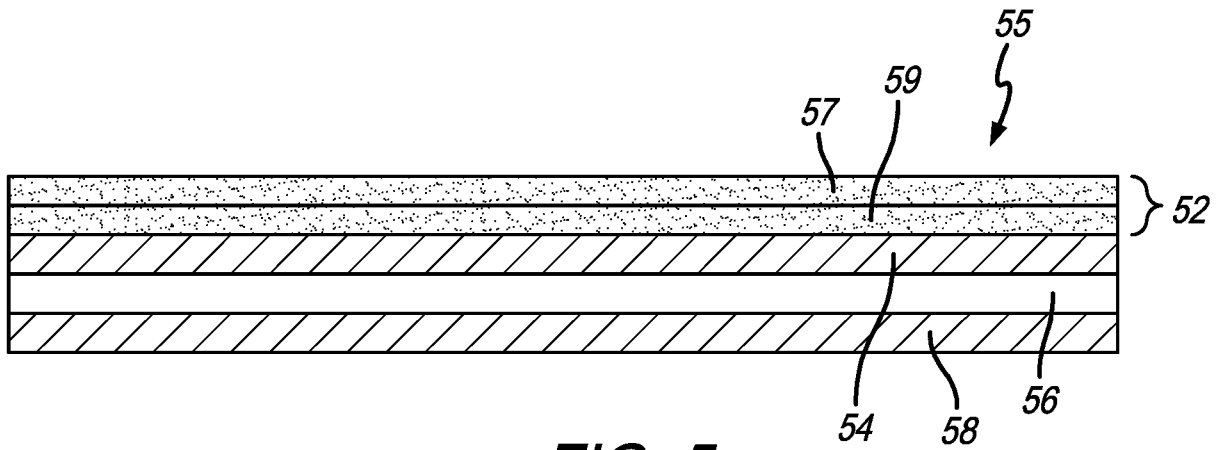


FIG. 5

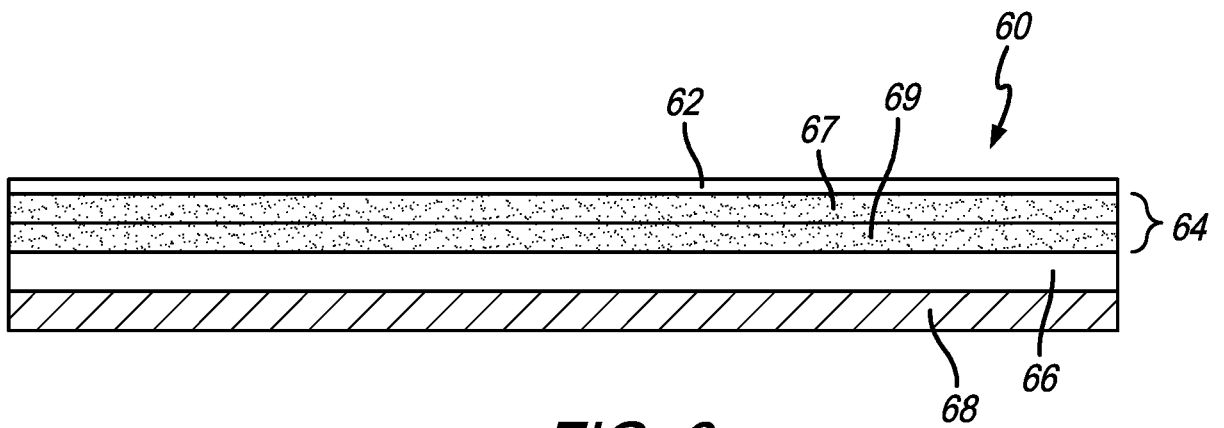


FIG. 6

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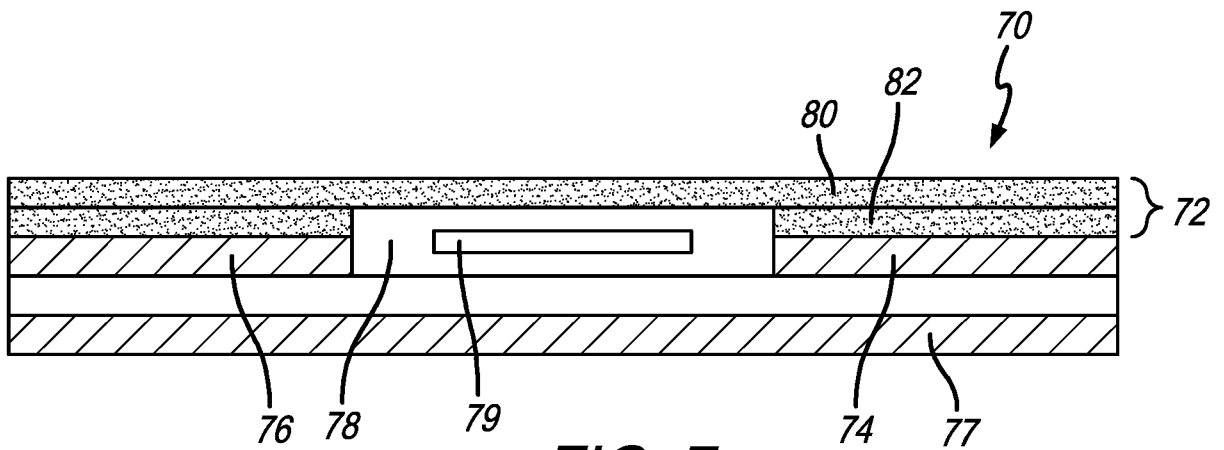


FIG. 7

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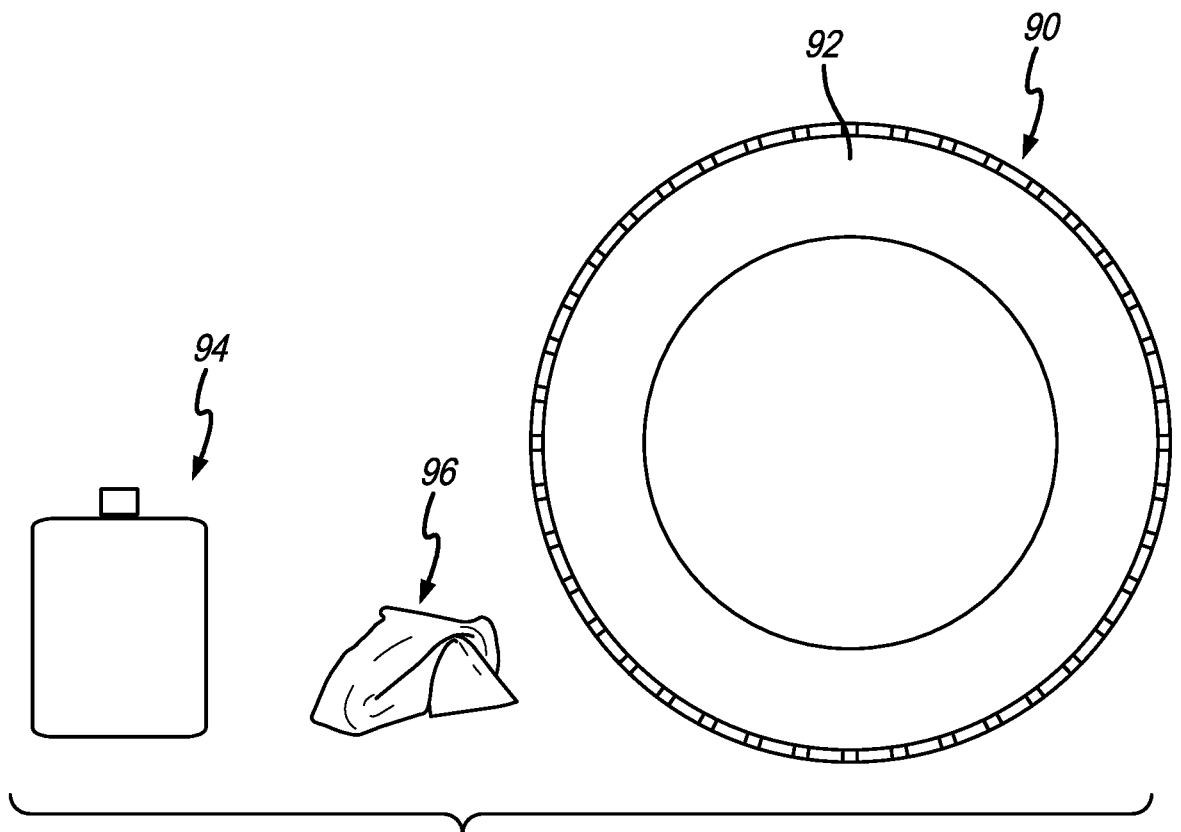


FIG. 8A

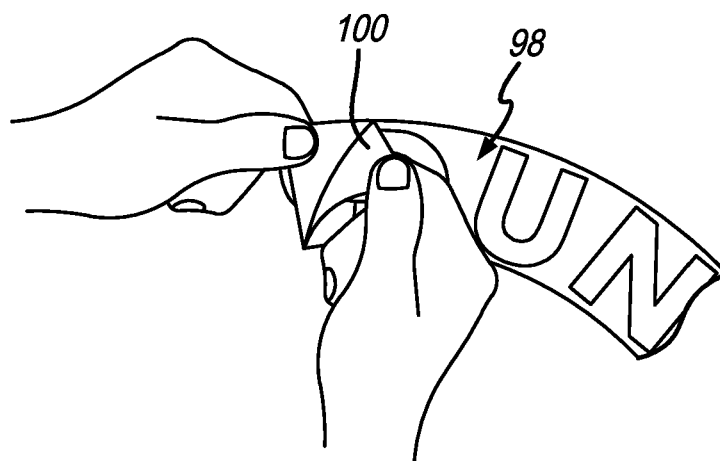


FIG. 8B

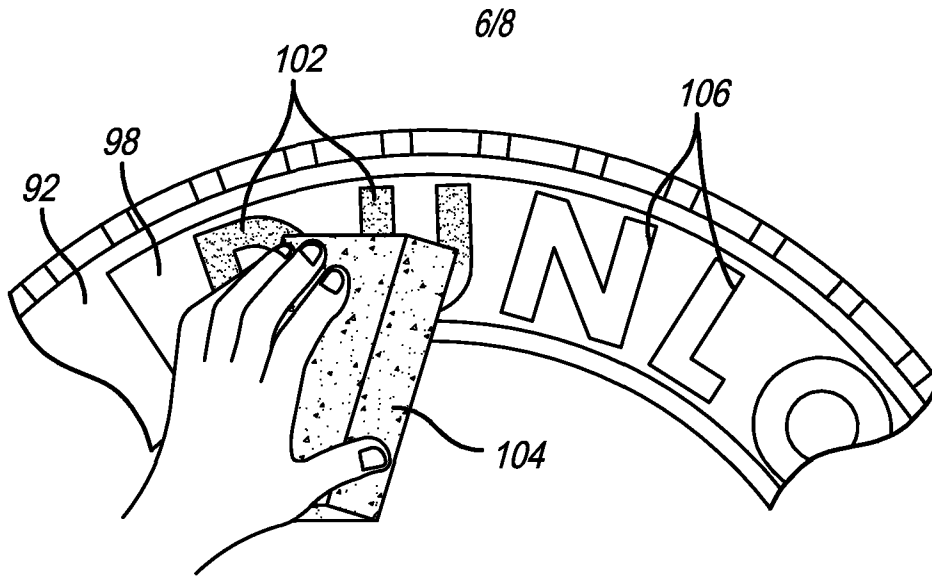


FIG. 8C

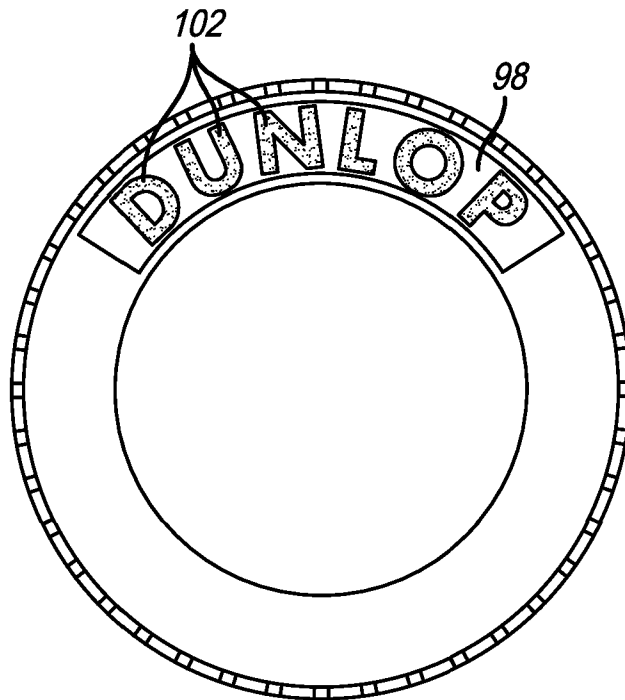


FIG. 8D

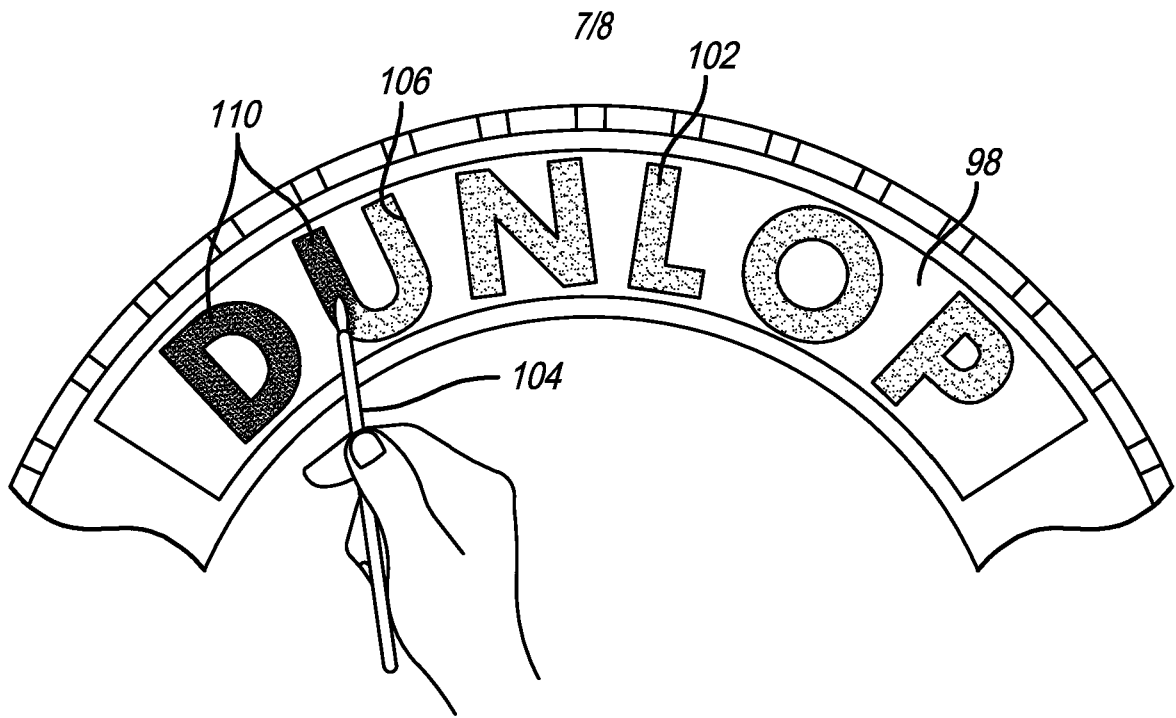


FIG. 8E

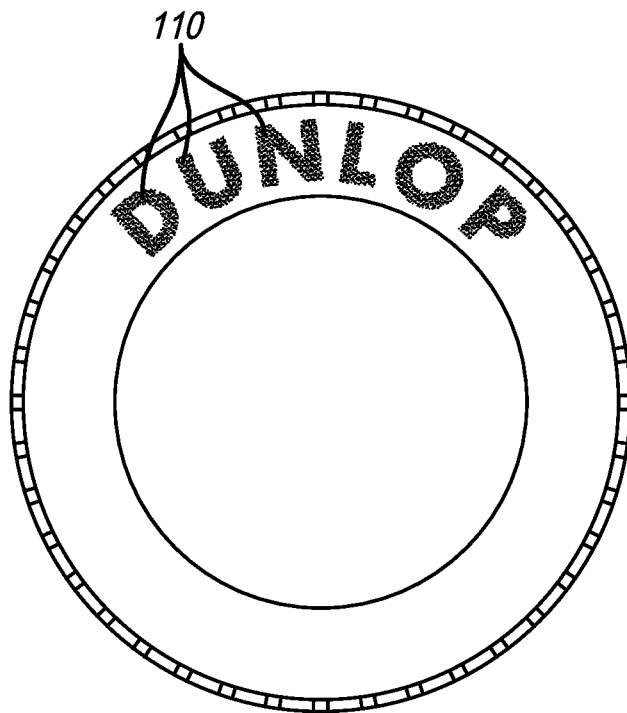


FIG. 8F

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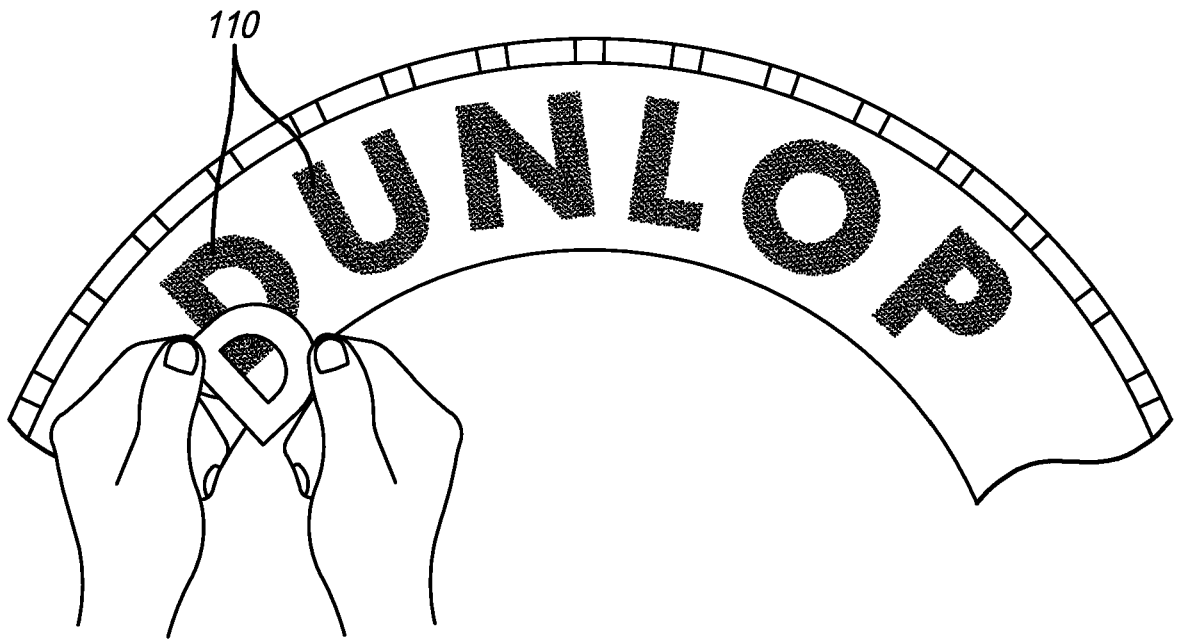


FIG. 8G

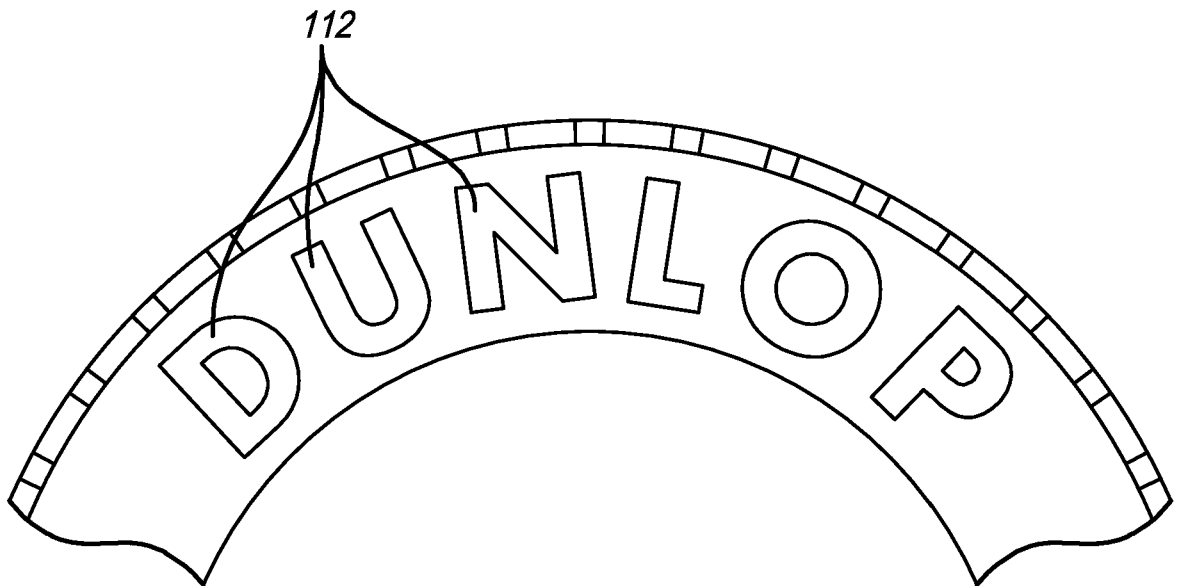


FIG. 8H

REMARKS

Prior to examination of this application, Applicant respectfully requests that the claims be amended as indicated herein. Support for the amendments may be found in the originally-filed specification, claims, and figures. No new matter has been introduced by the amendments.

The Commissioner is hereby authorized to charge any fees, which may be required, or credit any overpayment, to Deposit Account No. 19-2814.

Respectfully submitted,

Date: February 19, 2019

CUSTOMER NUMBER
125632

/ Grant T. Langton/
Grant T. Langton
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(213) 929-2525 (Fax)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.:	16/201,903	Confirmation No.:	1052
Inventor(s):	Keith George Ferry et al.	Group Art Unit:	2871
Filed:	November 27, 2018	Examiner:	To Be Assigned
Title:	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES	Docket No.	67838.00217

Mail Stop Amendments
Commissioner of Patents
P. O. Box 1450
Alexandria, VA 22313-1450

PRELIMINARY AMENDMENT

Dear Commissioner:

Prior to examination of the above-identified U.S. application, Applicant respectfully requests that the following preliminary amendments be entered:

Amendments to the Claims begin on page 2 of this paper.

Remarks/Arguments begin on page 6 of this paper.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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
16/201,903	11/27/2018	Keith George Ferry	67838.00217

CONFIRMATION NO. 1052

FORMALITIES LETTER



0000000104551424

125632
Snell & Wilmer (LA)
400 East Van Buren Street
One Arizona Center
Phoenix, AZ 85004

Date Mailed: 12/19/2018

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).

- The statutory basic filing fee is missing.
- The application search fee must be submitted.
- The application examination fee must be submitted.

The application is informal since it does not comply with the regulations for the reason(s) indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
 - The drawings must be reasonably free from erasures and must be free from alterations, overwriting, interlineations, folds, and copy marks. See Figure(s) 1-7.

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

- 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.)

- **\$ 75** basic filing fee.
- **\$ 80** surcharge.
- **\$ 330** search fee.
- **\$ 380** examination fee.
- **\$ (0)** previous unapplied payment amount.
- **\$ 865** TOTAL FEE BALANCE DUE.

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://portal.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/ebs>.

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**.

/sgorems/

PATENT APPLICATION FEE DETERMINATION RECORD						Application or Docket Number				
Substitute for Form PTO-875						16/201,903				
APPLICATION AS FILED - PART I										
		(Column 1)			(Column 2)					
FOR	NUMBER FILED	NUMBER EXTRA		SMALL ENTITY		OR	OTHER THAN SMALL ENTITY			
				RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)		
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	75		N/A			
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	330		N/A			
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	380		N/A			
TOTAL CLAIMS (37 CFR 1.16(i))	20	minus 20 =	*	x 50 =	0.00	OR				
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 =	*	x 230 =	0.00					
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					0.00					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	785		TOTAL			
APPLICATION AS AMENDED - PART II										
		(Column 1)			(Column 2)	(Column 3)				
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
						RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee (37 CFR 1.16(s))							OR		
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR			
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE		
		(Column 1)			(Column 2)	(Column 3)				
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
						RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee (37 CFR 1.16(s))							OR		
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR			
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE		
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.										
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".										
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".										
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.										



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
16/201,903	11/27/2018	2871	0.00	67838.00217	20	3

CONFIRMATION NO. 1052

FILING RECEIPT



0000000104551423

125632
Snell & Wilmer (LA)
400 East Van Buren Street
One Arizona Center
Phoenix, AZ 85004

Date Mailed: 12/19/2018

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)

Keith George Ferry, Studio City, CA;
Jason Michael Busch, Studio City, CA;

Applicant(s)

Keith George Ferry, Studio City, CA;
Jason Michael Busch, Studio City, CA;

Power of Attorney: The patent practitioners associated with Customer Number 125632

Domestic Priority data as claimed by applicant

This application is a CON of 15/139,272 04/26/2016 PAT 10137741
which claims benefit of 62/153,441 04/27/2015

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: 12/17/2018

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/201,903**

Projected Publication Date: To Be Determined - pending completion of Missing Parts

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES

Preliminary Class

349

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

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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

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

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

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

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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

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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).

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Electronic Acknowledgement Receipt

EFS ID:	34485775
Application Number:	16201903
International Application Number:	
Confirmation Number:	1052
Title of Invention:	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES
First Named Inventor/Applicant Name:	Keith George Ferry
Customer Number:	125632
Filer:	Grant T. Langton/Lauren Coyle
Filer Authorized By:	Grant T. Langton
Attorney Docket Number:	67838.00217
Receipt Date:	04-DEC-2018
Filing Date:	
Time Stamp:	20:13:24
Application Type:	Utility under 35 USC 111(a)

Payment information:

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

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	120418_POAs_as_filed_67838_00217.pdf	549609 3ee341b975d6a120a95404bdc09cab819d0479b0	no	2

Warnings:

Information:	
Total Files Size (in bytes):	549609
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. <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. <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. <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.	

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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
16/201,903	11/27/2018

(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: 125632
- 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

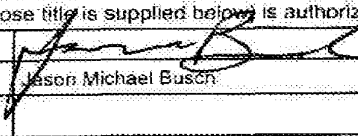
Firm or Individual Name				
Address				
City	State	Zip		
Country				
Telephone	Email			

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	Jason Michael Busch		
Title			

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 2 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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Doc Code: PA..

Document Description: Power of Attorney

PTO/AIA/82B (07-13)

Approved for use through 11/30/2014. OMB 0651-0051
U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

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Application Number

Filing Date

16/201,903

11/27/2018

(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:

OR

125632



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.)

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The address associated with the above-mentioned Customer Number

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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

Keith George Ferry

Title

Co-Founder / CEO

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 2 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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

Electronic Acknowledgement Receipt

EFS ID:	34413443
Application Number:	16201903
International Application Number:	
Confirmation Number:	1052
Title of Invention:	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES
First Named Inventor/Applicant Name:	Keith George Ferry
Customer Number:	125632
Filer:	Grant T. Langton/Lauren Coyle
Filer Authorized By:	Grant T. Langton
Attorney Docket Number:	67838.00217
Receipt Date:	27-NOV-2018
Filing Date:	
Time Stamp:	19:20:04
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	Application Data Sheet	WebADS.pdf	133172	no	8
			a38a4d17e4b953d541cd212c43ba8f0c53a a49a5		

Warnings:

Information:					
2		112718_CON_APP_as_filed_67838_00217.pdf	157202	yes	26
			a3ce87325cfad416fb232822fec8dd7d78f435af		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	22	
	Claims		23	25	
	Abstract		26	26	
Warnings:					
Information:					
3	Drawings-only black and white line drawings	112718_FIGS_as_filed_67838_00217.pdf	388463	no	8
			d416d861706ddf2a855bdd30a69c6f3fa6f16d53		
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Information:					
4	Oath or Declaration filed	112718_Priority_Decs_as_filed_67838_00217.pdf	285851	no	2
			15bd9b7c2ae4f05d8caa2e31ee45cf44345873c6		
Warnings:					
Information:					
5	Fee Worksheet (SB06)	fee-info.pdf	35207	no	2
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Warnings:					
Information:					
Total Files Size (in bytes):			999895		

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New Applications Under 35 U.S.C. 111

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

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

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

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What is Claimed is:

1. A display assembly for attachment with a vulcanized rubber article comprising:
one or more display layers of elastomeric material configured to provide a display indicia; and
an adhesive layer adhered to an interface surface of the one or more display layers, wherein one or more of the display layer or the adhesive layer has a material composition that acts as a barrier to impair the migration of material constituents from the adhesive layer to a surface layer of the display layer, and wherein the adhesive layer is formed from a material capable of chemically bonding with a surface of a vulcanized rubber article.
2. The display assembly as recited in claim 1 comprising a first display layer and a second display layer disposed beneath the first display layer.
3. The display assembly as recited in claim 2 wherein the first display layer is colored differently from the second display layer.
4. The display assembly as recited in claim 1 further comprising an intermediate layer interposed between the one or more display layers and the adhesive layer.
5. The display assembly as recited in claim 4 further comprising an intermediate adhesive layer interposed between the one or more display layers and the intermediate layer.
6. The display assembly as recited in claim 1 further comprising a protective layer disposed over the one or more display layers and forming an outermost surface of the display assembly, the protective layer formed from an optically transparent material.
7. The display assembly as recited in claim 1 further comprising a cavity disposed therein.
8. The display assembly as recited in claim 7 further comprising an element disposed within the cavity.

9. The display assembly as recited in claim 1 wherein the cavity is disposed beneath the one or more display layers.
10. The display assembly as recited in claim 2 wherein the first display layer includes one or more openings therethrough, and wherein the second display layer is visible through the one or more openings.
11. A method for attaching a display assembly to a surface of a vulcanized rubber article comprising the steps of;

preparing a surface of a vulcanized rubber article by cleaning the surface;
applying an adhesive material to form an adhesive layer;
placing a display assembly into contact the surface with the adhesive layer interposed therebetween to form a bond between the display assembly and surface, the display assembly comprising:

one or more display layers of elastomeric material constructed to provide a display indicia, wherein one of the display layers having an interface surface with the adhesive layer comprises a material composition that acts as a barrier to impair the migration of material constituents from the adhesive layer to a surface layer of the one or more display layers.
12. The method as recited in claim 11 further comprising treating the surface to roughen the surface before the step of placing.
13. The method as recited in claim 12 further comprising applying a template to the surface before the step of applying the adhesive material, wherein the template has a cut out section and wherein, during the step of applying, the adhesive material is applied to the surface exposed through the cut out section.
14. The method as recited in claim 11 further comprising applying pressure to the display assembly after the step of placing.

15. The method as recited in claim 11 wherein further comprising the step of heating the adhesive material after the step of applying.
16. The method as recited in claim 11 wherein the display assembly comprises a transfer carrier disposed on the one or more display layers and, wherein after the step of placing, the transfer carrier is removed from the display assembly.
17. The method as recited in claim 11 wherein after the step of placing, a further display layer is placed onto the one or more display assembly display layers and an adhesive layer is interposed between the further display layer and the display assembly.
18. The method as recited in claim 11 wherein the vulcanized rubber article is tire, and wherein the surface is a sidewall surface of the tire.
19. A vulcanized rubber tire comprising:
 - a target surface disposed along a portion of the rubber tire;
 - a display assembly disposed onto the target surface and comprising:
 - a display layer of elastomeric material; and
 - an adhesive layer attached to an interface surface of the display layer;
 - wherein one of the display layer or the adhesive layer comprises a material composition that acts as a barrier to impair migration of material constituents from the adhesive layer to an outer surface of the display layer.
20. The rubber tire as recited in claim 19 wherein the display layer comprises two display layers, and wherein the two display layers are configured within the assembly to provide a desired display indicia.

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES		
First Named Inventor/Applicant Name:		Keith George Ferry		
Filer:		Grant T. Langton/Lauren Coyle		
Attorney Docket Number:		67838.00217		
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:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				785

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**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN
APPLICATION DATA SHEET (37 CFR 1.76)****Title of
Invention****DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO
VULCANIZED RUBBER ARTICLES**

As the below named inventor, I hereby declare that:

This declaration
is directed to:

The attached application, or

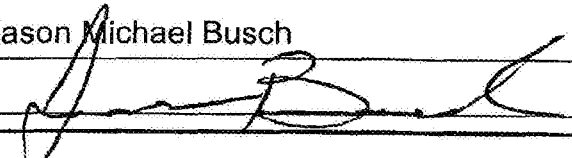
United States application or PCT international application number 15/139,272
filed on 04/26/2016

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 INVENTORInventor: Jason Michael BuschDate (Optional): 4/26/16Signature: 

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 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.

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

Title of
Invention

**DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO
VULCANIZED RUBBER ARTICLES**

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 15/139,272

filed on 04/26/2016

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.

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LEGAL NAME OF INVENTOR

Inventor: Keith George Ferry

Date (Optional):

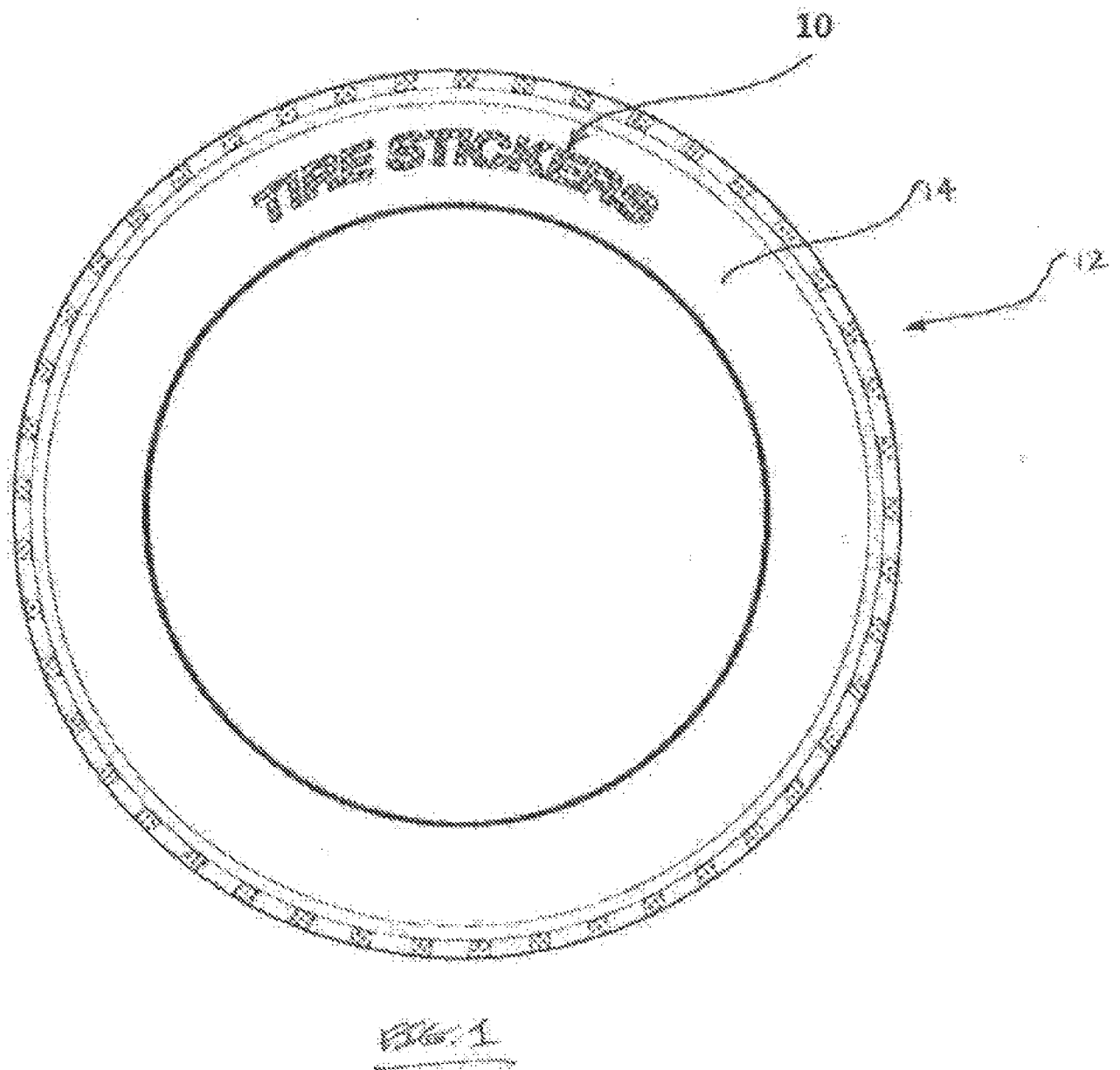
4/26/16

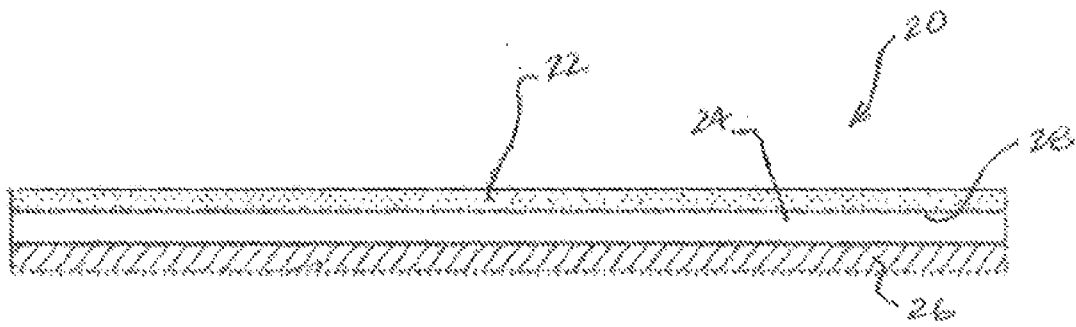
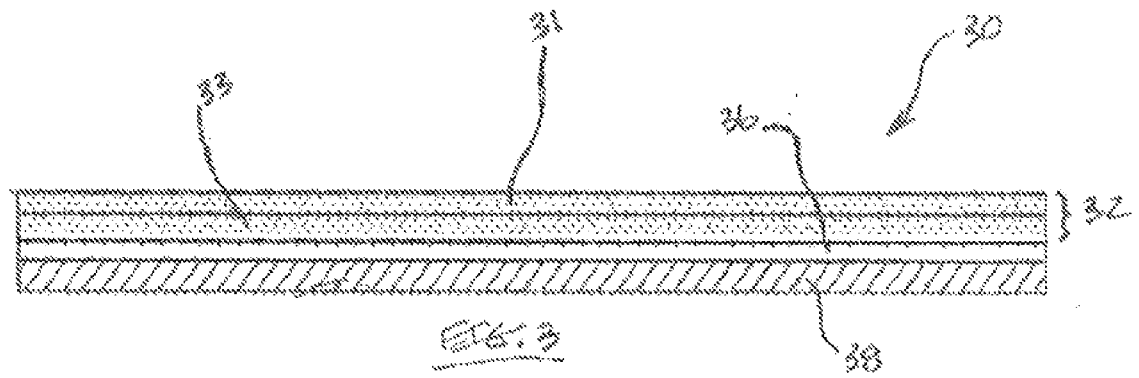
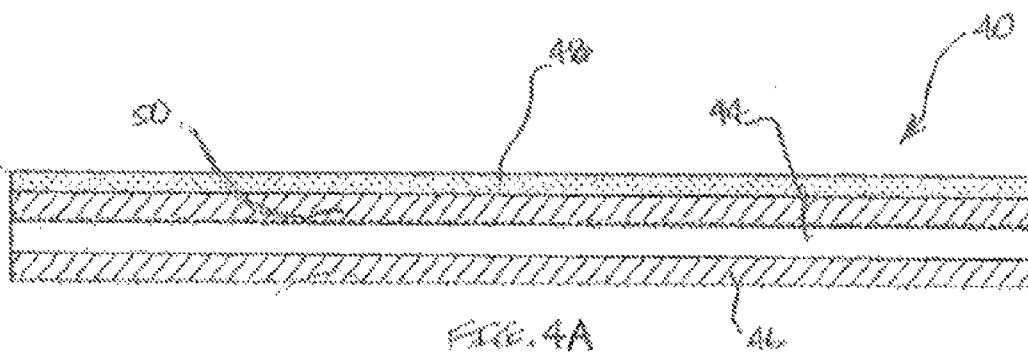
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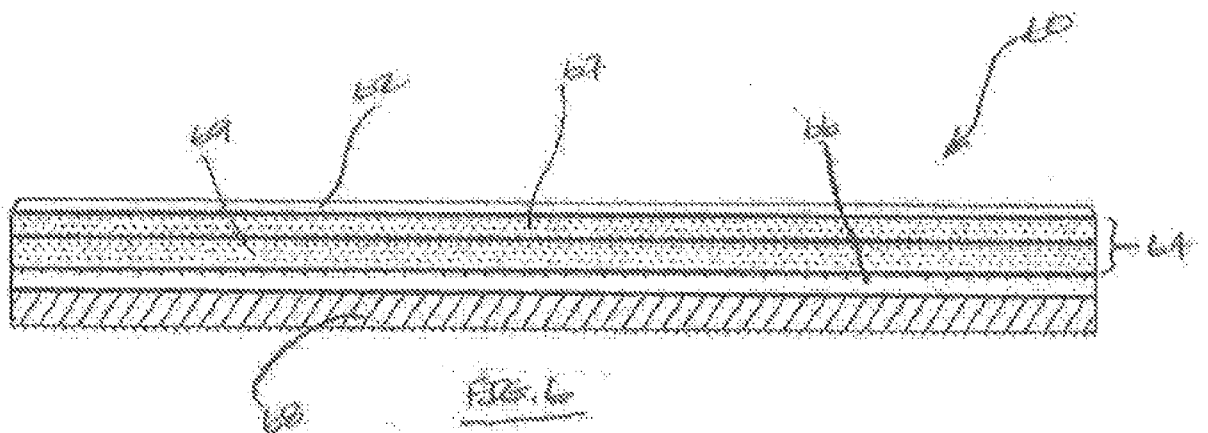
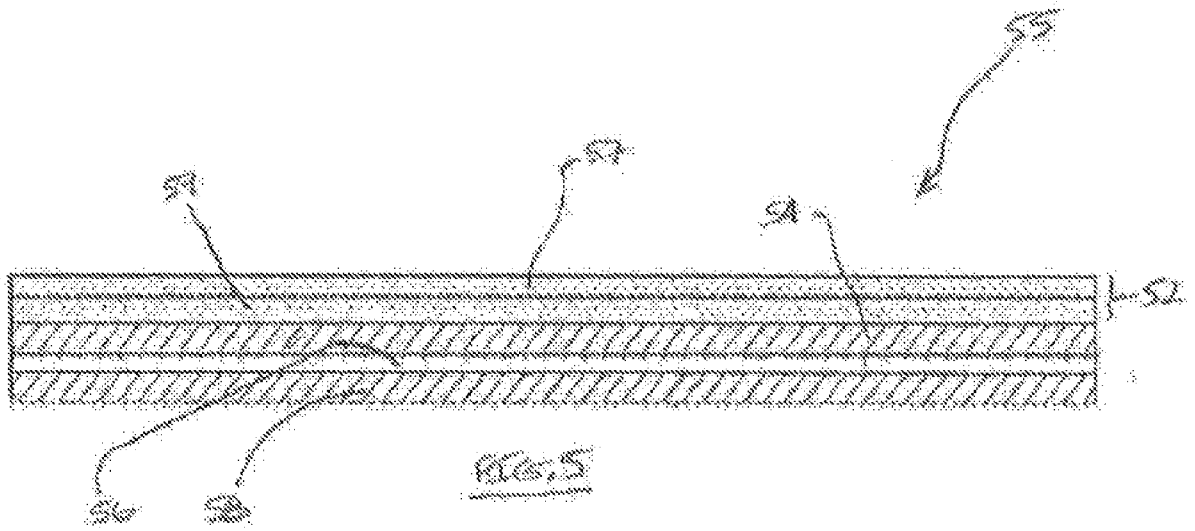
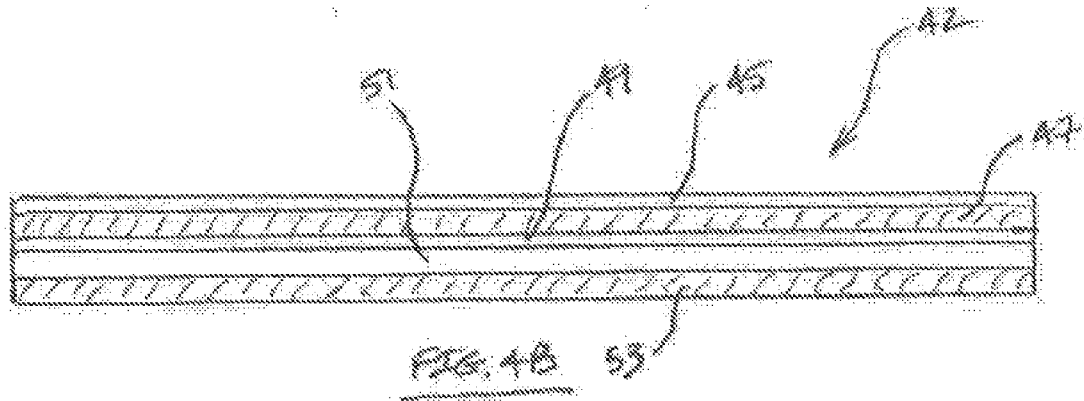
Note: An application data sheet (PTO/SB/44 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

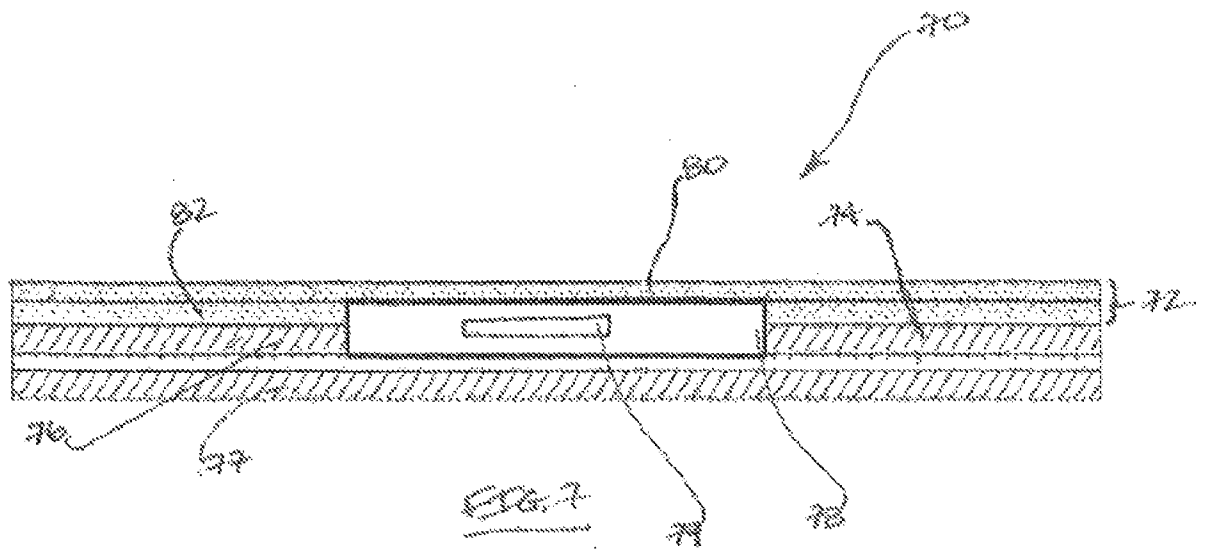
This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is 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.

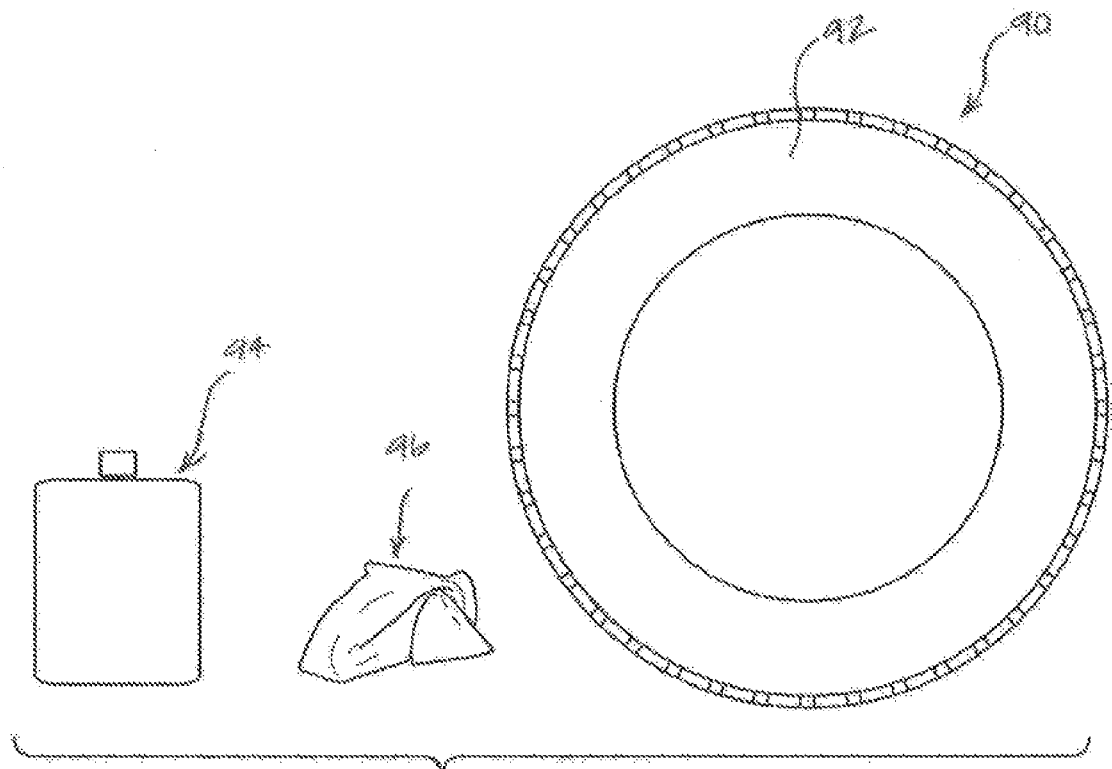
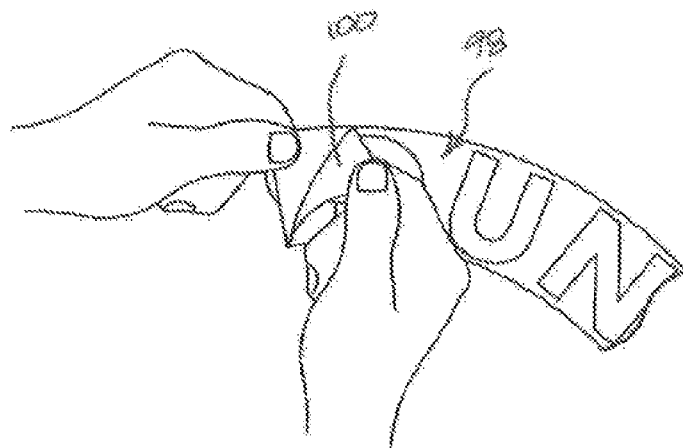
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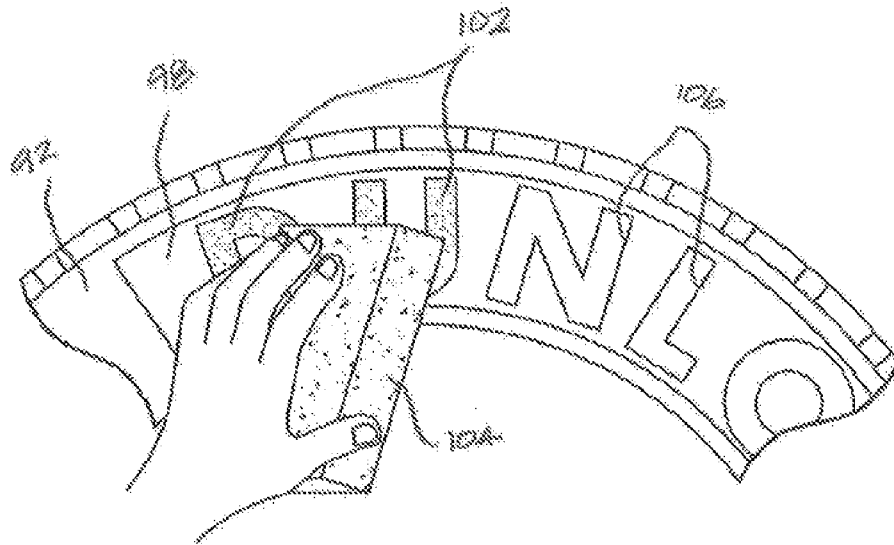
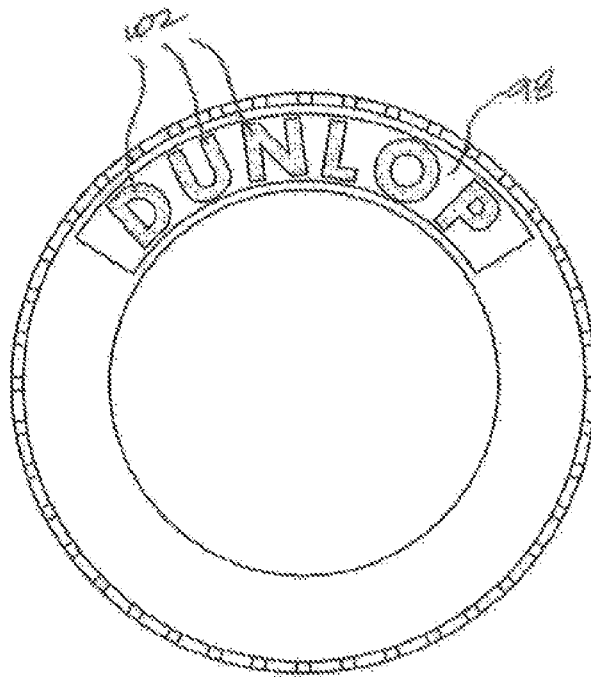


FIG. 2FIG. 3FIG. 4A





*FIG. 8A**FIG. 8B*

*FIG. 8C**FIG. 8D*

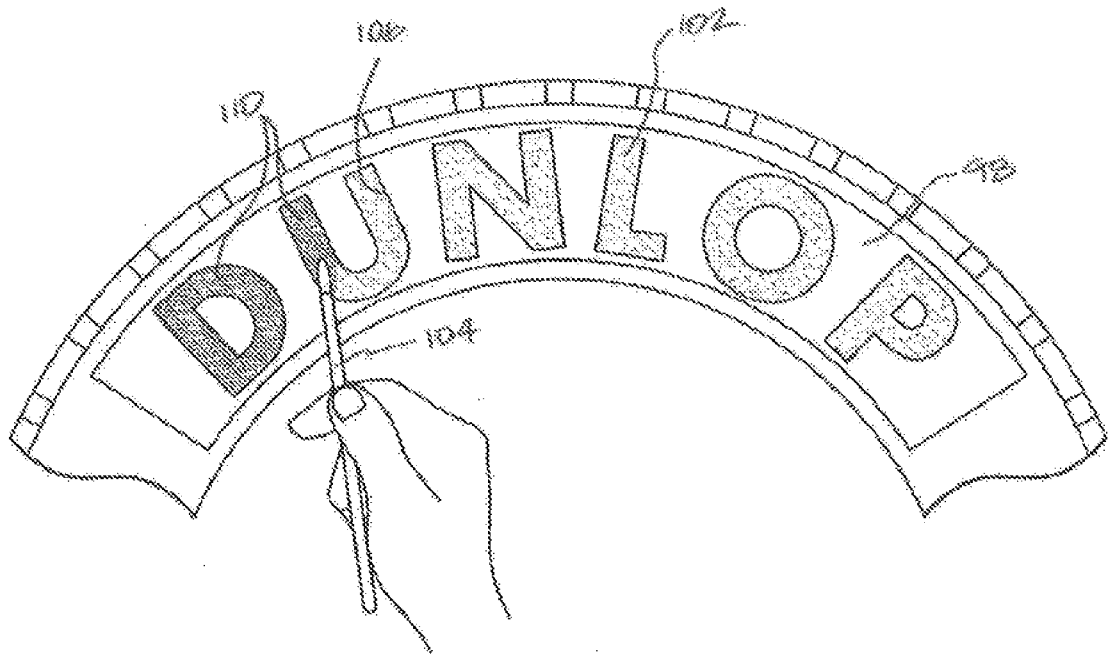


FIG. 8E

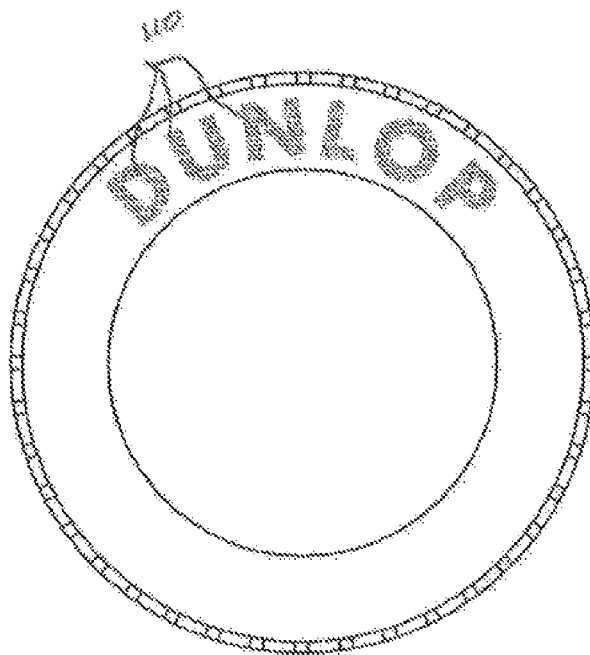


FIG. 8F

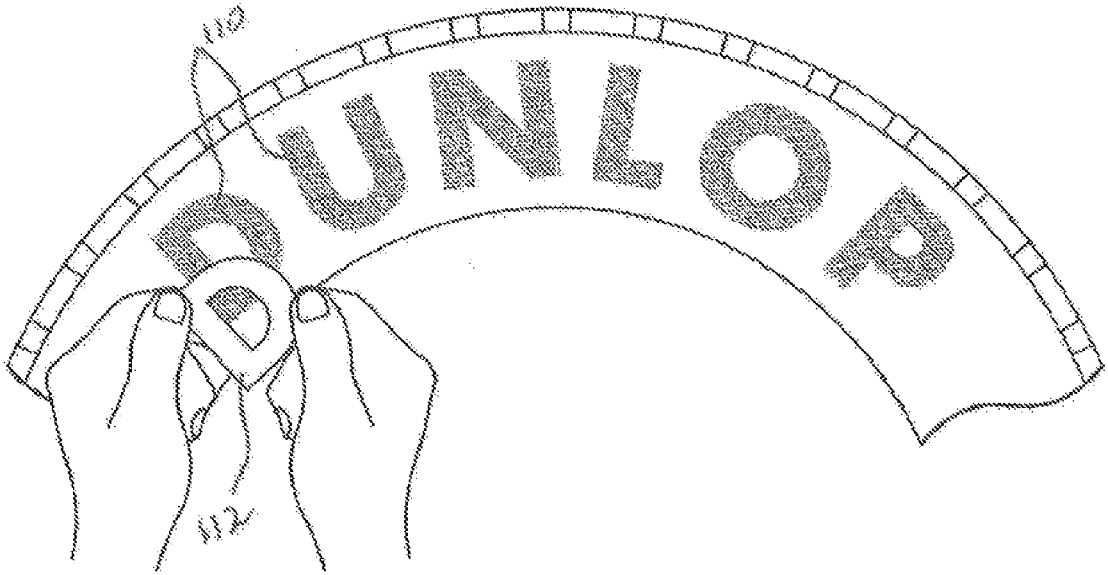


FIG. 8G

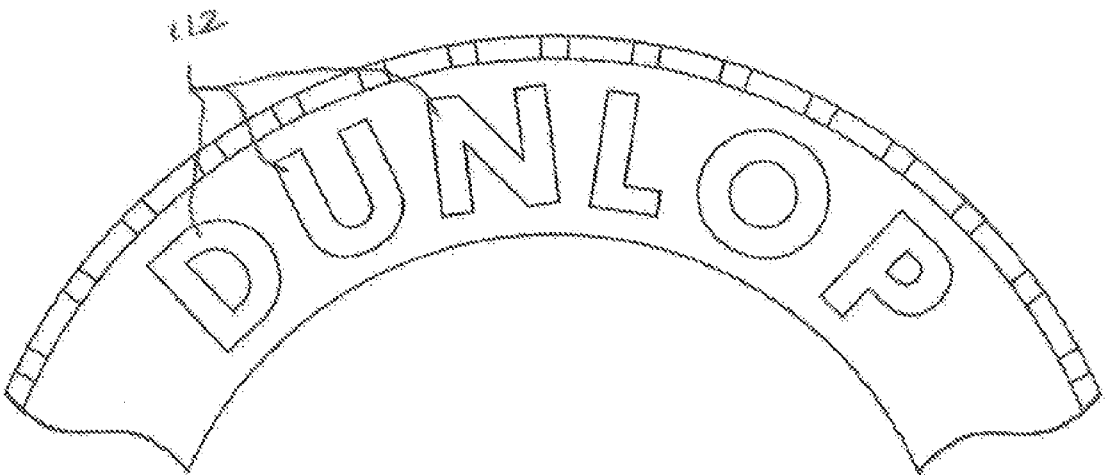


FIG. 8H

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	67838.00217
		Application Number	
Title of Invention	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2:

☐	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
--------------------------	---

Inventor Information:

Inventor 1					
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Keith	George	Ferry		
Residence Information (Select One)		☒ US Residency ☐ Non US Residency ☐ Active US Military Service			
City	Studio City	State/Province	CA	Country of Residence ⁱ	US
Mailing Address of Inventor:					
Address 1		3322 Berry Drive			
Address 2					
City	Studio City	State/Province	CA		
Postal Code	91604	Country ⁱ	US		
Inventor 2					
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Jason	Michael	Busch		
Residence Information (Select One)		☒ US Residency ☐ Non US Residency ☐ Active US Military Service			
City	Studio City	State/Province	CA	Country of Residence ⁱ	US
Mailing Address of Inventor:					
Address 1		3322 Berry Drive			
Address 2					
City	Studio City	State/Province	CA		
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	67838.00217
		Application Number	
Title of Invention	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES		

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ An Address is being provided for the correspondence Information of this application.

Customer Number	125632		
Email Address	ipladocket@swlaw.com	Add Email	Remove Email
Email Address	glangton@swlaw.com	Add Email	Remove Email

Application Information:

Title of the Invention	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES		
Attorney Docket Number	67838.00217	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	8	Suggested Figure for Publication (if any)	1

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number		67838.00217	
		Application Number			
Title of Invention		DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES			
Customer Number		125632			
Prefix	Given Name	Middle Name	Family Name	Suffix	Remove
Registration Number					
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Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
		15139272	2016-04-26	10137741	2018-11-27
Prior Application Status		Expired		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
15139272	Claims benefit of provisional	62153441	2015-04-27		
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.					

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ⁱ (if applicable)
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	67838.00217
		Application Number	
Title of Invention	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES		

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐	This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013. NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	67838.00217
	Application Number	
Title of Invention	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	67838.00217
		Application Number	
Title of Invention	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES		

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.

☐ 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 ¹		Postal Code	
Phone Number		Fax Number	
Email Address			

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

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	67838.00217
		Application Number	
Title of Invention	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES		

Assignee Information including Non-Applicant Assignee Information:

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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		
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	67838.00217
		Application Number	
Title of Invention	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES		

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	/Grant T. Langton/			Date (YYYY-MM-DD)	
First Name	Grant T.	Last Name	Langton	Registration Number	39739
Additional Signature may be generated within this form by selecting the Add button.					

**DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO
VULCANIZED RUBBER ARTICLES**

ABSTRACT

Display assemblies as disclosed herein are configured for attachment with a vulcanized rubber article and are provided in the form of different material layers. Display assemblies generally comprise one or more display layers of elastomeric material configured to provide a desired display indicia, an intermediate layer formed from an elastomeric material different from that of the one or more display layers, and an adhesive layer wherein the intermediate layer is interposed between the adhesive layer and the one or more display layers. The one more display layers may be configured to act together or separately to provide a desired display indicia to provide a desired visual display or feature on the surface of the vulcanized rubber article, which may be a sidewall surface of a tire.

DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES

CROSS-REFERENCE TO RELATED APPLICATIONS

This patent application is a continuation of U.S. Patent Application No. 15/139,272 filed April 26, 2016, now U.S. Patent No. 10,137,741, which claims the benefit of U.S. Provisional Patent Application No. 62/153,441, filed on April 27, 2015, which applications are herein incorporated by reference in their entirety.

FIELD

This disclosure relates to display assemblies and methods for applying the same to a vulcanized rubber article.

BACKGROUND

The use of decals or the like for use on vulcanized rubber articles such as a sidewall portion of a tire or the like is somewhat known in the art, e.g., in the form of lettering and/or designs, for the purpose of adding features of aesthetic appearance, branding or the like to the vulcanized article containing the same. Such decals known in the art adapted for such uses are constructed in a manner that is either intended for temporary rather than permanent service, and/or that is adapted for application at a point of manufacture of the vulcanized articles. For example, traditional techniques for establishing tire sidewall markings involve extrusion or molding of black rubber and often the addition of colored inks which are cured in parallel with the tire during the vulcanization process. This process, though well established and scaled for industry, requires significant investment in materials, equipment and labor along with sizable wastage costs resulting from voids, blemishes and other defective designs. In addition, this technique is extremely limiting in terms of customizable designs due to molds and dies required to achieve the desired variations, and thus the availability of this customization to individual consumers and even customers internal to the industry is extremely limited.

It is, therefore, desired that display assemblies for use with a vulcanized article be constructed in a manner that permits not only variation in the nature of the display itself, e.g., the

nature of the indicia be it one or a combination of characters, designs, emblems, and combinations thereof and the like, but variation in the method of applying the same so as to facilitate application as part of or subsequent to the manufacture of the vulcanized article. It is further desired that such display assembly be constructed in a manner that facilitates use of the same once applied for a long duration, e.g., the life of the vulcanized article. It is still further desired that such display assembly be constructed in a manner so as to facilitate such long-term without sacrificing the integrity and aesthetic appearance of the display assembly.

SUMMARY

Display assemblies as disclosed herein are specially constructed for attachment with a vulcanized rubber article to provide a desired display indicia, which may be a visual display or a feature that is visually or otherwise detectable. Display assemblies as disclosed herein generally comprise a composite of different material layers specially engineered to provide a desired display indicia in a manner that will last a long time on the vulcanized rubber article. Display assemblies comprise one or more display layers of elastomeric material configured to provide a desired display indicia, an intermediate layer formed from an elastomeric material different from that of the one or more display layers, and an adhesive layer, wherein the intermediate layer is interposed between the adhesive layer and the one or more display layers.

In an example, the adhesive layer is formed from a material forming a chemical bonding between the display assembly and the surface of the vulcanized rubber article. The display assembly may comprise two display layers, wherein one display layer may be disposed beneath another display layer, and wherein the display layers may each be of a different color and/or be patterned or otherwise configured so as to provide a desired display indicia by interaction of the two. An intermediate adhesive layer may be interposed between one or more display layers and the intermediate layer. If desired, a transparent protective layer may be disposed over the one or more display layers, forming an outermost surface of the display assembly. The display assembly may comprise a cavity disposed therein that may include an element disposed therein.

Display assemblies as disclosed herein may be attached to the surface of a vulcanized article by applying an adhesive material to form the adhesive layer, wherein the adhesive layer

may be applied to one or both of the surface of the vulcanized article and an underlying surface of the display assembly, and placing a display assembly into contact with the surface of the vulcanized rubber article to form a bond between the display assembly and surface. In an example, a stencil may be used to ensure placement of the display assembly in a desired arrangement, or a transfer carrier may be used to provide the display assembly in the desired arrangement for placement onto the surface.

Display assemblies as disclosed herein are constructed provide flexibility in the nature of the display indicia itself, and variation in the method of applying the same so as to facilitate application as part of or subsequent to the manufacture of the vulcanized article. Also, display assemblies as disclosed herein are constructed in a manner that facilitates use of the same once applied for a long duration, e.g., the life of the vulcanized article, without sacrificing the integrity and/or aesthetic appearance of the display assembly.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features and advantages of display assemblies and methods for making the same as disclosed herein will be appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 is a perspective view of an example display assembly as disclosed herein as attached to a vulcanized article in the form of a tire sidewall;

FIG. 2 is a cross-sectional side view of a single display layer embodiment three-layer assembly '20' as disclosed herein, wherein layer '22' is defined as the outermost aesthetic layer which is vulcanized for a permanent bond along underside surface '28' to a shock absorbing barrier layer '24' layered with an adhesive layer '26' for permanently bonding to the vulcanized rubber article;

FIG. 3 is a cross-sectional side view of a second example display assembly as disclosed herein, wherein a double display layer embodiment comprises a four-layer assembly '30' having a first display layer '31' as the outermost aesthetic display layer which is vulcanized for a permanent bond to a second display layer '33' which is further vulcanized to a shock absorbing barrier layer '36' layered with an adhesive layer '38' for permanently bonding to the vulcanized rubber article;

FIG. 4A is a cross-sectional side view of a third example display assembly as disclosed herein comprising a single display layer with double layer adhesive and barrier four-layer assembly '40' having layer '48' as the outermost aesthetic display layer which is bonded with a shock absorbing barrier layer '44' using a permanent adhesive layer '50' and the barrier layer '44' is layered with another adhesive layer '46' for permanently bonding to the vulcanized rubber article;

FIG. 4B is a cross-sectional side view of an alternative third example display assembly as disclosed herein comprising dual display layers with double layer adhesive and barrier – five layer assembly '42' having layer '45' as the outermost display layer which is bonded with a second or intermediate display layer '49' using an intermediate adhesive layer '47' and the intermediate display layer is bonded with a shock absorbing barrier layer '51' that is layered with another adhesive layer '53' for permanently bonding to the vulcanized rubber article;

FIG. 5 is a cross sectional side view of a fourth example display assembly as disclosed herein comprising a double display layer '52' embodiment five-layer assembly '55' having layer '57' as the outermost aesthetic display layer which is vulcanized for a permanent bond to a second display layer '59' which is bonded with a shock absorbing layer '56' using a permanent adhesive layer '54' and the barrier layer '56' is layered with another adhesive layer '58' for permanently bonding to the vulcanized rubber article;

FIG. 6 is a cross section side view of a fifth example display assembly as disclosed herein comprising a double display layer '64' four-layer embodiment assembly '60' having layer '62' as a protective over-laminate layer disposed over all or a portion of the display layer(s) '67' and '69' vulcanized to a shock absorbing barrier layer '66' and layered with a permanent adhesive layer '68' for bonding to the vulcanized rubber article;

FIG. 7 is a cross section side view of a fifth example display assembly as disclosed herein comprising a multiple layer assembly '70' with cavity '78' having an embedded functional element '79' within the construction of the assembly, wherein the assembly '70' comprises a double display layer '72' with aesthetic layers 80 and 82 which also serve as perimeter layers to the cavity '78', wherein the display layers are vulcanized and bonded to a barrier layer '76' with a permanent adhesive layer '74' and having another layer of permanent adhesive '77' for bonding to the vulcanized rubber article; and

FIGS. 8A to 8H are schematic views of different steps of an example method for attaching a display assembly as disclosed herein to sidewall of a vulcanized rubber article in the form of a tire.

DETAILED DESCRIPTION

Display assemblies or constructions as disclosed herein are specially engineered to facilitate attachment to a vulcanized article, which may include but is not limited to tires, mud flaps, or any other member or element that is vulcanized or made from vulcanized rubber. Display assemblies as disclosed herein are provide for the purpose of providing a desired aesthetic appearance, product identification, tracking, branding, advertising, to provide a desired functional aspect to the vulcanized article, and the like to such vulcanized article. In an example, display assemblies as disclosed herein may comprise one or more elastomeric display layers providing the desired display image or function, an intermediate or barrier layer formed of an elastomeric material, and a layer of curable adhesive that is formed from a material capable of forming a strong adhesion bond with a surface of the vulcanized article. The display assemblies as disclosed herein may optionally comprise an adhesive layer interposed between the display layer and one or more of the barrier layers, and may comprise various combinations of one or more display layers, one or more intermediate or barrier layers, and one or more adhesive layers as called for by the specific end use application. Further, display assemblies as disclosed herein may optionally comprise an overcoat or transparent protective layer disposed over the display layer.

FIG. 1 illustrates an example display assembly or construction 10 as disclosed herein as attached to a vulcanized article 12. Display assemblies as disclosed herein can be used with a variety of differently configured vulcanized articles, wherein a unifying feature of such articles or attachment substrates is that they are formed from or have an outer surface comprising vulcanized rubber. In an example, the vulcanized article may be a rubber tire, wherein the display assembly is configured to be adhered to a portion of the rubber tire. In an example, the portion of the rubber tire may be a sidewall 14 of the tire. While a particular configuration or type of vulcanized article, and a particular portion of such article, has been described as being useful as the article or substrate for adhering display assemblies as disclosed herein thereto, it is to be understood that the use of display assemblies as disclosed herein is not to be limited to such types of vulcanized articles and/or portion of the same, and such is provided for purpose of example and reference.

The display assembly 10 is provided in a desired form or configuration depending on the desired display indicia or function intended, which can be in the form of a letter, numeral, symbol, design, pattern, logo, insignia, or the like that may be continuous or non-continuous in form depending on the particular end-use application. For example, the display assembly 10 can be configured in the shape of a letter and a number of the display assemblies can be used alone or in conjunction with one or more other display assemblies that may be continuous with one another or separate from one another to provide a desired word, term, brand, logo, message, symbol, function or the like on a surface of the desired vulcanized article. For example, the display assembly 10 can be configured as a continuous member that is disposed along an entire portion of the vulcanized article, e.g., such as a sidewall stripe or other form of continuous indicia, or only along a partial designated portion of the vulcanized article.

In an example, each such display assembly 10 comprises one or more display layers that provide an outer surface of the display assembly that operates to visually provide the display image or indicia or function. The one or more display layers may be formed from an elastomeric material and may be configured to provide a desired display image or indicia on the outer surface of the display assembly 10. In an example, the display layer may be constructed to have a desired color and/or pattern, and or shape, and/or texture useful to provide a desired display image or indicia or function. In an example, the display layer may be configured and/or colored and/or patterned to produce a desired display image or indicia or function in conjunction with an underlying barrier layer. For example, the display layer may comprise one or more openings, e.g., a pattern of openings, and be of one color, and an underlying barrier layer may be of another color making it viewable through the display layer openings to provide the desired display image or indicia effect or function on the outer surface of the display assembly. In the event that two or more display layers are used, the different display layers may be configured and/or colored and/or textured, and/or patterned differently for the purpose of being combined together to provide the overall desired display image or indicia on the outer surface of the display assembly.

In an example, each display layer may be configured having a generally similar shape, e.g., in the shape of a letter, object, or numeral, wherein one of the display layers is provided in one color and another of the display layers is provided in a different color, and wherein the

display layers are sized differently, so when combined together they operate to provide a desired visual display effect. In an example, an upper display layer may be provided having a white color and a lower display layer beneath the upper display layer may be provided having a black color, wherein the lower display layer is sized somewhat larger than the upper display layer so as to enhance the visual effect provided by the combined display layers.

Alternatively, the display layer may be provided in the form of a single layer that is patterned or that has a desired cut-out segment, and the desired display image is provided by contrast with an underlying other layer of the display assembly, e.g., which may be another display layer or a barrier layer. For example, the use of a patterned display layer in one color disposed on top of an underlying display layer or barrier layer of another color may operate to provide a desired indicia, e.g., that may be in the form of a barcode or the like used to provide an identification or other type of purpose or function.

The display assembly 10 is adhered to or otherwise attached to a surface of the desired vulcanized article 12. In an example, the display assembly is adhered to the vulcanized article in a manner as better described below that produces a strong and lasting attachment therewith, e.g., to facilitate attachment of the display assembly to the vulcanized article for a long period of time which may be the service life of the vulcanized article. In an example, the display article is chemically bonded with the vulcanized article. In an example, the display assembly may be configured to match the contour or other surface geometry or surface feature of the vulcanized article that it is to be used with. For example, in the event that the vulcanized article is a side wall surface of a rubber tire, display assemblies as disclosed here may be configured to match the contour of the side wall surface to promote a desired optimal fit therewith when attached thereto.

FIG. 2 illustrates a first example display assembly 20 as disclosed herein comprising, moving from a surface portion of the display assembly 20 to a portion attached to a vulcanized rubber article, a display layer 22, an intermediate or barrier layer 24, and an adhesive layer 26. As noted above, the display assembly 20 is configured having a shape and size as desired for a particular end-use application. In an example, the display layer 22 is provided in the form of a

single layer of elastomeric material that may be colored, and/or patterned, and/or textured as desired to provide a desired display image or indicia viewable on the outer surface of the display assembly 20. In an example embodiment, elastomeric materials useful for forming the display layer 22 include and are not limited to vulcanized rubber, natural rubber, SBR, nitrile rubber, neoprene rubber, rubber based or elastomeric ink having properties of aesthetic appeal of functional use, high elongation, UV and chemical resistance and abrasion resistance, and combinations thereof. In an example, depending on the particular size and configuration of the display assembly 20, the display layer 22 may have a thickness greater than about 0.01 mm, of from about 0.01 to 10 mm, 0.05 to 5 mm, 0.1 to 3 mm, and in a particular example about 0.4 mm.

In an example, the intermediate or barrier layer 24 is attached or adhered along an underside surface 28 of the display layer 22. In an example, the intermediate layer 24 extends along and covers the entire underside surface 28 of the display layer. Alternatively, the intermediate layer 24 may extend along a partial portion of the display layer underside surface 28, which is less than the entire portion and more than a majority or 51 percent of the total area of the display layer underside surface 28. In an example, the intermediate or barrier layer 24 is formed from a material capable of providing properties of shock absorbance, elastomeric expansion and/or contraction properties compatible with the vulcanized rubber article that the display assembly is to be attached therewith, and a desired degree of conformity between the adjacent surfaces of the display layer and the outer surface of a vulcanized rubber article (so as to maximize the surface contact area between the display assembly and vulcanized rubber article). Further, in the example illustrated in FIG. 1, it is desired that the intermediate layer 24 be formed from a material capable of being chemically bonded to or vulcanized with the display layer 22.

It is also desired that the intermediate or barrier layer 24 be formed from a material capable of acting as a barrier to minimize or prevent the migration of any unwanted constituents of the adhesive layer 26 and/or the vulcanized rubber article may otherwise operate to damage or degrade the design image and/or feature provided by the display layer 22. In an example, the intermediate layer is formed from an elastomeric material. Elastomeric materials useful for forming the intermediate layer 24 include and are not limited to gum rubber, vulcanized natural

rubber SBR, nitrile rubber, polyurethane, or comparable materials having properties of high elongation, conformity and chemical resistance to notable mold release agents common in the vulcanized rubber of pneumatic tires, and combinations thereof. In an example, depending on the particular size and configuration of the display assembly 20, it is desired that the intermediate layer 24 thickness be that which is sufficient to enable the intermediate layer to function in the above-described manner. The exact thickness of the intermediate layer is understood to vary depending on the particular type of material selected for the intermediate layer as well as the particular end-use application. In an example, the intermediate layer 24 may have a thickness greater than about 0.008 mm, from about 0.008 to 10 mm, about 0.01 to 5 mm, about 0.1 mm to 1.5 mm, and in a particular example of about 0.5 mm.

It is desired that the adhesive layer 26 be formed from a material capable of forming a chemically, heat-activated or otherwise permanent bonded attachment with the vulcanized rubber article. In an example, it is desired that the attachment be one having a service life that is the same as the vulcanized rubber article so as to provide a permanent attachment therewith to permit the display assembly to function throughout the service life of the vulcanized article. The particular type of material used for the adhesive layer may vary depending on the particular display assembly application environment, e.g., in a manufacturing environment of where the vulcanized article is being made, or in a consumer environment subsequent to the manufacture of the vulcanized article. In an example, embodiment, such as one where the display assembly is being attached to the vulcanized rubber article at the point of the vulcanized rubber article being manufactured, the adhesive layer may be formed from a material capable of forming the desired chemical bond or being vulcanized thereto under elevated temperature conditions, e.g., heat-activated adhesives. Such materials include but are not limited to thermoplastic and thermoset adhesives, heat vulcanizing cements common in retread applications, water-based or solvent based polymer polyurethane based adhesives, and combinations thereof. Such application may also call for some degree of elevated pressure being applied to the display assembly during adherence by the adhesive layer. In an example, such elevated pressure may be in the range of from about 3 to 100 Psi.

In an example, embodiment, such as one where the display assembly is being attached to the vulcanized rubber article by a consumer or the like at a point subsequent to the manufacture of the vulcanized rubber article, the adhesive layer may be formed from a material capable of forming the desired chemical bond or being vulcanized thereto ambient temperature conditions, e.g., by chemical reaction instead of being heat activated. Such materials include but are not limited to chemical cements common in retread applications, cyanoacrylate, epoxies, rubber-based acrylic pressure sensitive adhesives and combinations thereof. Such application may also call for some degree of elevated pressure being applied to the display assembly during adherence by the adhesive layer. In an example, such elevated pressure may be in the range of from about 3 to 10 Psi.

In an example, depending on the particular size and configuration of the display assembly 20, it is desired that the adhesive layer 26 thickness be that which is sufficient to enable the adhesive layer to function in the above-described manner. The exact thickness of the adhesive layer is understood to vary depending on the particular type of material selected for the adhesive layer as well as the particular end-use application. In an example, the adhesive layer 26 may have a thickness greater than about 0.006 mm, from about 0.006 mm to 0.5 mm, 0.01 mm to 0.3 mm, 0.02 mm to 0.1 mm, and in a particular example of about 0.04 mm.

In an example, the display assembly described above and illustrated in FIG. 2 may be made by joining the display layer and intermediate layer together and then subjecting the same to vulcanizing conditions of elevated temperature and/or pressure, after which time the adhesive layer may be combined therewith, e.g., at the point of applying the display assembly. While the example display assembly illustrated in FIG. 2 has been disclosed as comprising three separate and distinct layers, it is to be understood one or both of the display layer or the adhesive layer may be configured so as to include a barrier composition at an interface therebetween that may operate to provide the barrier properties noted above, thereby avoiding the need use three separate and distinct layers for the display assembly.

FIG. 3 illustrates a second example display assembly 30 as disclosed herein comprising, moving from a surface portion of the display assembly 30 to a portion attached to a vulcanized

rubber article, a display layer 32, an intermediate or barrier layer 36, and an adhesive layer 38. Unlike the example illustrated in FIG. 2 and described above, the display layer 32 in this example is made up of two or more different display layers, e.g., a first or upper display layer 31 and a second or lower display layer 33.

In this embodiment, each display layer may be sized, shaped, patterned, colored and/or textured differently from the other to provide a desired display indicia when combined together. For example, the first display layer 31 may be white in color and have a particular size, wherein the second display layer 33 may be black in color and be sized slightly larger than the first display layer for purpose of providing a desired display visual indicia. This is but one example of how the different display layers 31 and 33 can be used with one another to provide a desired display indicia. In another example, as noted above, the first display layer may be of one color and have one or more openings cut into it, and the second display layer is of another color so such color is displayed through the openings to provide a desired visual indicia on the surface of the display assembly. These are but a few examples of how the first and second display layers can be used to provide a desired display indicia for purpose of example and reference, and it is to be understood that all such variations are to be within the scope of the display assemblies as disclosed herein. Also, while an example comprising two display layers has been disclosed, it is to be understood that display assemblies as disclosed herein may comprise more than two display layers depending on the particular display indicia desired for the particular end use application.

The display layers 31 and 33, as well as the intermediate layer 36 and adhesive layer 38 may each be formed from the same types of respective materials described above for the earlier examples. In an example, the display layers 31 and 33 may have the same thickness as described above, so that the overall thickness of the display layer 32 is generally greater than that of the earlier described examples. However, the thickness of the display layer 32 may also be less than or equal to the thickness of earlier described examples so as to meet the requirements of a particular function or aesthetic desire. As noted above for the example display assembly of FIG. 2, the example display assembly illustrated in FIG. 3 may alternatively comprise a display layer or adhesive layer configured having a barrier composition at an interface, so as to avoid the need to obtain desired barrier properties through a separate and distinct barrier layer.

In an example, the display assembly described above and illustrated in FIG. 3 may be made by joining the display layers, and intermediate layer together and then subjecting the same to vulcanizing conditions of elevated temperature and/or pressure, after which time the adhesive layer may be combined therewith, e.g., at the point of applying the display assembly.

FIG. 4A illustrates a third example display assembly 40 as disclosed herein comprising, moving from a surface portion of the display assembly 40 to a portion attached to a vulcanized rubber article, a display layer 48, an intermediate adhesive layer 50, an intermediate or barrier layer 44, and an adhesive layer 46. The principle difference between this second example display assembly 40 and that disclosed above and illustrated in FIG. 2 is the presence and use of an intermediate adhesive layer 50 interposed between the display layer 48 and the intermediate or barrier layer 44. The presence of such an intermediate adhesive layer 50 in this second example operates to provide a greater degree of adhesion between the display layer 48 and the intermediate layer 44, and may also operate to provide an extra degree of barrier protection against the migration of any unwanted constituents from the intermediate layer 44, adhesive layer 46, and/or the vulcanized rubber article that the display assembly is attached to.

The materials used in this second example for the display layer 48, intermediate layer 44, and adhesive layer 46 may be selected from the same types of materials described above for the first two examples. The thicknesses of the display layer 48, intermediate layer 44, and adhesive layer 46 may also be the same as that described above for the first two examples.

The intermediate adhesive layer 50 is formed from a material capable of forming a bonded attachment between an underside surface of the display layer 48 and a surface of the intermediate barrier layer 44, and optionally acting as a barrier to minimize or prevent the migration of any unwanted constituents into the display layer 48. In an example, the intermediate adhesive layer 50 is formed from a thermoset adhesive. Thermoset adhesives useful for forming the intermediate adhesive layer 50 include and are not limited to heat vulcanizing cements common in retread applications, water-based or solvent based polymer polyurethane based adhesives, epoxies and combinations thereof. In an example, depending on the particular size and configuration of the display assembly 40, it is desired that the intermediate adhesive

layer 50 thickness be that which is sufficient to enable the intermediate adhesive layer to function in the above-described manner. The exact thickness of the intermediate adhesive layer is understood to vary depending on the particular type of material selected for the display layer and the intermediate layer as well as the particular end-use application. In an example, the intermediate adhesive layer 50 may have a thickness greater than about 0.006 mm, of from about 0.006 mm to 0.5 mm, about 0.01 mm to 0.3 mm, and in a particular example about 0.025 mm.

In an example, the display assembly described above and illustrated in FIG. 4 may be made by joining the display layer, the intermediate adhesive layer, and intermediate layer together and then subjecting the same to vulcanizing conditions of elevated temperature and/or pressure, after which time the adhesive layer may be combined therewith, e.g., at the point of applying the display assembly. While the example display assembly illustrated in FIG. 4A has been disclosed as comprising four separate and distinct layers, it is to be understood that one or more of the display layer, intermediate adhesive layer, barrier layer, or the adhesive layer may be configured as a composite having properties of another layer so as to reduce the total number of separate and distinct layers used for making the display assembly 40. For example, the intermediate adhesive layer may be configured having a barrier composition along an interface with the adhesive layer, thereby avoiding the need to use a separate and distinct barrier layer, or the barrier layer may be configured comprising an adhesive composition on or both of its surfaces so as to avoid having to use one or more separate adhesive layers. These are just a few examples of how composite compositions may be used in such multilayer display assemblies to reduce the total number of separate and distinct materials layers used while still providing all of the desired described properties.

FIG. 4B illustrates an example display assembly 42 that is somewhat similar to that illustrated in FIG. 4A, in that it comprises a display layer 45 on a top surface, an intermediate adhesive layer 47 below the display layer. However, in this particular example, the display assembly 42 includes a second or intermediate display layer 49 that is interposed between the intermediate adhesive layer 47 and the barrier layer 51, and like in the third example an adhesive layer 53 is disposed beneath the barrier layer. A feature of such construction is the ability to configure the uppermost display layer 45, e.g., shape, size and/or patterning of openings or the

like to reveal at least a portion of the intermediate display layer 49 to provide the desired display indicia. Also, in such an example, a sub assembly made up of the adhesive layer 53, barrier layer 51, and intermediate display layer 49 may be made and combined in the manner noted above and adhered to the desired substrate portion, e.g., a vulcanized rubber article. After such sub assembly has been attached to the desired substrate, then the uppermost display layer 45 may be attached thereto through the use of the intermediate adhesive layer 47. The ability to construct the display assembly in this manner, through the use of a sub assembly and later applied display layer adds flexibility in being able to provide the desired display layer after a portion of the assembly has already been installed on the substrate. It also allows for the subassembly to be manufactured and kept in stock as the standard subassembly for a variety of different types of upper most display layers. An example of such a display assembly may include white walls, red walls, or other colored walls or other desired type of indicia that may now be selected and applied after the standard stock subassembly has been attached to the substrate.

FIG. 5 illustrates a fourth example display assembly 55 as disclosed herein comprising, moving from a surface portion of the display assembly 55 to a portion attached to a vulcanized article, a display layer 52, an intermediate adhesive layer 54, an intermediate barrier layer 56, and an adhesive layer 58. Like the example illustrated in FIG. 3 and described above, the display layer 52 in this example is made up of two or more different display layers, e.g., a first or upper display layer 57 and a second or lower display layer 59. Like the example illustrated in FIG. 4A and described above, the display assembly 50 comprises an intermediate adhesive layer 54 that is interposed between the display layer 52 and the intermediate barrier layer 56.

The intermediate adhesive layer 54 operates in the same manner as described above for the example illustrated in FIG. 4A, to provide a greater degree of adhesion between the display layer 52 and the intermediate barrier layer 52, and may be formed from the same materials and have the same layer thickness as that described above for the example illustrated in FIG. 4A.

In an example, the display assembly 50 may be made by joining the display layer, the intermediate adhesive layer, and intermediate layer together and then subjecting the same to vulcanizing conditions of elevated temperature and/or pressure, after which time the adhesive layer may be combined therewith, e.g., at the point of applying the display assembly.

FIG. 6 illustrates a fifth example display assembly 60 as disclosed herein comprising, moving from a surface portion of the display assembly 60 to a portion attached to a vulcanized article, protective layer 62, a display layer 64 (comprising an upper display layer 67 and a lower display layer 69), an intermediate barrier layer 66, and an adhesive layer 58. A feature of this example is the presence of a protective layer 62 that is disposed over the display layer, wherein the protective layer is formed from an optically transparent material and may be used to enhance and/or protect the display layer from external elements that may damage or otherwise degrade the indicia provided by the display layer, thereby enhancing the service life of the display assembly. While the protective layer has been disclosed in the context of being used with the particular display assembly construction as illustrated in FIG. 6, it is to be understood that the protective layer may be used with any and all of the display assemblies as disclosed herein.

In an example, the protective layer may cover the entire surface of the underlying display layer, or display layers in the event the display assembly comprises more than one display layer, or a partial portion of the display layer depending on the particular display indicia and/or the particular end-use application. Materials useful for forming the protective layer are preferably elastomeric, e.g., having the same degree of flexibility or elasticity as that of the underlying display layer, and may be selected from materials including and not limited to polyurethane, vinyl, polyethylene terephthalate, rubber-based elastomeric inks, and combinations thereof. In an example, depending on the particular size and configuration of the display assembly, it is desired that the protective layer thickness be that which is sufficient to enable the protective layer to function in the above-described manner. The exact thickness of the protective layer is understood to vary depending on the particular type of material selected for the protective layer as well as the particular end-use application. In an example, the protective layer may have a thickness greater than about 0.006 mm, of from about 0.006 mm to 0.3 mm, about 0.01 mm to 0.2 mm, and in a particular example about 0.025 mm.

FIG. 7 illustrates a sixth example display assembly 70 as disclosed herein comprising, moving from a surface portion of the display assembly 70 to a portion attached to a vulcanized article, a display layer 72, an intermediate adhesive layer 74, an intermediate barrier layer 76,

and an adhesive layer 77, wherein a cavity 78 is disposed within the assembly for the purpose of accommodating an element or object 79 therein. Like the example illustrated in FIG. 5 and described above, the display layer 72 in this example is made up of two or more different display layers, e.g., a first or upper display layer 80 and a second or lower display layer 82.

A feature of this particular embodiment is the presence of a cavity 78 that is formed in the display assembly 70 for the purpose of accommodating placement of an element or object 79 therein. For purpose of reference, a display construction somewhat similar to that illustrated in FIG. 5 was used to disclose the cavity feature for purposes of reference and example, and it is to be understood that display assemblies as disclosed herein comprising cavities may be embodied having other display assembly constructions as disclosed herein.

In this example, the cavity is formed within the second display layer 82 and the intermediate adhesive layer 74 and is configured to accommodate a desired element or object therein, wherein such element or object may be any type of rigid or non-rigid element, passive or non-passive element, functional or nonfunctional element that may be useful for including in the display assembly. Examples of the types of objects or elements that may be disposed in the cavity include RFID elements, GPS elements, lighting elements such as LEDs or the like, and the like. In an example, the cavity is configured within the construction to provide an area capable of accommodating such an element or object without damaging the element or object, and without causing damage to the display assembly itself during use of the vulcanized rubber article that it is attached thereto. In the example illustrated in FIG. 7, the cavity is positioned beneath the first display layer 80, and if desired the first display layer may comprise one or more openings for the purpose of displaying a portion of the object or element disposed within the cavity. It is to be understood that display assemblies comprising a cavity as disclosed herein may include the cavity positioned differently, e.g., formed within one or more different assembly layers, than that illustrated in FIG. 7 depending on the particular display assembly, the particular configuration of the cavity, the particular element or object disposed within the cavity and its intended purpose and/or function, and/or the particular end-use application of the vulcanized article.

While the cavity feature of display assemblies has been disclosed with reference to particular examples and illustrations, it is to be understood that display assemblies as disclosed herein may be constructed with the cavity positioned other than as disclosed or illustrated. For example, the design assembly may be configured with the cavity disposed along an outer portion of the assembly, which may be a display layer, in which case an element disposed within the cavity would be viewable from outside of the display assembly. An example of such may be one where a light element is disposed within the cavity for purposes of providing illumination or an illuminated visual effect or the like outside of the display assembly that is viewable from outside of the vulcanized article. In such example, the cavity may be open and exposed to the external environment, or a layer of transparent material or the like may be optionally disposed thereover. This is but one example provided for the purpose of illustrating how the cavity may be positioned differently within the display assembly to enable a desired function or purpose.

While the display assemblies as disclosed herein have been referenced by example and illustration having certain features and/or characteristics, it is to be understood that display assemblies meeting the general construction parameters as disclosed herein and having additional elements are intended to be within the scope of display assemblies as covered herein. For example, while display assemblies may be configured to provide a desired display indicia or the like through the shape, design, configuration or the like of the one or more display layers, Display assemblies as disclosed herein may be configured to provide a desired display indicia through the use of printed, marked or other type of provided feature that may be included in or on the display layer. For example, the display assembly may comprise a desired display indicia provided in the form of an ink symbol, letter, or other marking feature or object that is disposed on or into the display layer, which symbol, letter, or other marking feature or object may be a brand, logo or the like.

Display assemblies as disclosed herein may have a different total thickness depending on the particular construction features within the display assembly. In an example, the display assembly may have a total thickness, as measured from a top surface of the display assembly (adjacent the display layer or protective layer) to a bottom surface (adjacent the adhesive layer) of greater than about 0.0025 mm, from about 0.0025 mm to 10 mm, from about 0.01 to 5 mm,

about 0.1 to 3 mm, and in a particular example about 0.4 mm. It is to be understood that the exact thickness of the display assembly can and will vary depending on the particular display assembly construction and/or end-use application.

Display assemblies as disclosed herein may be constructed to accommodate different conditions for applying the display assembly to a desired vulcanized rubber article, e.g., to accommodate application during manufacturing of the vulcanized rubber article, or to accommodate application after the vulcanized rubber article has been made. In an example, display assemblies may be attached to a surface of a vulcanized rubber article, e.g., a sidewall surface of a pneumatic tire, by reaction that may include and not be limited to heat and/or pressure and/or chemical bonding so as to provide a desired aesthetic appeal in the form of desired visual indicia, such as lettering and/or other objects or shapes or designs and/or functional use, such as with bar coding or RFID technology, capable of withstanding the tire manufacturer recommended life cycle. In an example, the element or object disposed within the cavity and affixed to the vulcanized article via the display assembly as disclosed herein may have compatibility programmable functionality, such as RFID read/write capability, circuit board/programmable system which can control a device such as a light element like an LED in a predetermined manner. Such functionality may be innate with the element disposed in the cavity or may be controlled by a separate component whether connected by wire or wirelessly, e.g., blue-tooth enabled, radio controlled or other frequency connection. In an example, the cavity may be configured within the display assembly to accommodate a light element there, such as one or more LEDs therein, so that the display assembly emits light that can be seen by a person looking at the vulcanized article. In an example, the light element may be controlled to provide a desired illumination.

FIGS. 8A to 8H illustrate different steps useful for applying the display assembly according to an example method of applying. Referring to FIG. 8A, in an example method of applying, the intended or target surface 92 of the vulcanized rubber article 90 is cleaned so as to remove any dirt, oil, debris or other foreign agents or containments that could interfere with forming a desired attachment bond with the display assembly. A suitable cleaning solution 94 or preparation agent can be used for this purpose. In an example, such cleaning solution 94 can be

selected from but not limited to the group of organic or inorganic solutions such as acetone or the like. In an example, the cleaning solution 94 can be applied and used to clean the surface by use of a fabric material 96 or the like. As illustrated in FIG. 8C, in an example, it may be desired to further treat the surface 92 by roughening the surface through the use of an abrasive means 104 such as sand paper or the like until the surface displays a rough texture, and then cleaning the treated surface, e.g., with the cleaning solution, to ensure that it is free of any surface debris from the treatment process.

Referring to FIG. 8B, in certain applications, it may be desired to use a stencil 98 or template for the purpose of properly/accurately locating the display assembly on the surface of the vulcanized rubber article. For example, in the case where a series of the display assemblies are to be applied to a sidewall surface of a tire to provide a desired string of letters, numerals and/or designs or the like, a stencil 98 or template may be used to ensure that the display assemblies are positioned at a proper spacing and/or at a proper location along the sidewall surface. The stencil 98 may be provided in the form of a semi-rigid material such as paper, plastic film or the like that can be applied to the target surface. As shown in FIG. 8C, the stencil 98 can be removably attached to the target surface 92 or held in place by hand. Referring back to FIG. 8B, in an example, the stencil 98 or template comprises a pressure sensitive adhesive backing and is prepared for adhered placement against the target surface by removing a carrier sheet 100 covering the adhesive and pressing the stencil into contact with the target surface 92 at the desired position to ensure an adequate bond, specifically around the cut out areas in the stencil (as best shown in FIG. 8C). Referring to FIG. 8C, in an example where a stencil 98 or template is used, the steps of treating the target surface 92 by sanding or the like and then cleaning the treated surface is preferably done after the stencil has been placed into position, thereby limiting the target surface area 102 being prepared to only that exposed by the cut out areas 106 of the stencil 98. FIG. 8D illustrates the target surface areas 102 of the sidewall as treated by sanding with the template 98 still in place.

Alternatively, instead of using a separate stencil for purposes of applying the display assembly in a desired arrangement, the display assembly may be configured having a transfer carrier adhered to an upper most surface of the display assembly, wherein the display assembly is

positioned on the transfer film in a desired arrangement for placement onto the target surface without the use of a stencil to provide the a visual display having the desired arrangement.

Referring to FIGS. 8E and 8F, a desired adhesive material 110, selected from the materials described above, is applied to the treated surface 102 by suitable means, which can be by spray, roll, brush 104 or the like to form a desired thickness of the adhesive layer to receive the display assembly. In example where a stencil 98 is used, the adhesive 104 is applied to the cut out section or sections 106 and the template 98 is removed before the adhesive cures so as to avoid difficult template removal. FIG. 8F illustrates the treated surfaces coated with adhesive material 110 after with the template removed, wherein the treated surfaces having the adhesive material is in the form of a series of letters. Alternatively, or in addition to the method of adhesive application disclosed above, the adhesive may be applied to the underside surface of the display assembly that is then applied to the target surface.

In an example, the adhesive material once applied to the target surface is allowed to dry for a predetermined period of time, which amount of time can and will vary depending in the particular type of adhesive material used. In an example, the adhesive material that is used is Heavy Duty Blue Vulcanizing Fluid by Tech International and it is allowed to dry for a period of approximately 20-30 minutes. Referring to FIGS. 8G and 8H, once the adhesive material 110 has dried for the determined time, the display assembly 112 is placed onto the adhesive material layer 110. In an example, the display assembly 112 is pressed into contact with the adhesive layer and target surface by using a stitching tool, whereby moderate pressure is applied onto the display assembly by rolling the stitching tool over the entire surface area of the display assembly to ensure complete bonding and adherence between the display assembly and the vulcanized rubber article by the adhesive layer. FIG. H illustrates a number of the display assemblies 112 attached to respective target surfaces containing the adhesive material. In the example where a transfer carrier is used rather than the stencil, once the display assembly is applied to the target surface and bonded thereto, the transfer carrier is removed from the display assembly, having served its purpose to provide the display assembly in a desired form, configuration or arrangement on the target surface.

In an example, it is desired that the so-applied display assembly be allowed to cure for a predetermined amount of time before the vulcanized rubber article is placed into use. For example, when the article is a tire sidewall, it is desired that the display assembly be allowed to cure for at least 8 hours before a vehicle comprising the tire or tires are operated. In an example, ideally it is desired that the display assembly be allowed to cure for 24 hours before the vulcanized article in the form of tires are operated.

In another example method, display assemblies as disclosed herein may be applied to a desired vulcanized rubber article at the point of manufacture. In an example, wherein the vulcanized rubber article is a tire, display assemblies may be applied in a similar manner as disclosed above, with a difference being that the adhesive material may be provided in the form of a heat-activated material, in which case once the adhesive material is applied to the target surface heat is used to cause the display assembly to be adhered thereto. In such example, pressure may also be applied by suitable machinery as the adhesive material is curing to ensure a desired bonding occurs between the vulcanized rubber article and the display assembly.

While the display assemblies and method of applying the same as disclosed herein have been presented with respect to the described and illustrated embodiments, it is to be understood that the disclosure is not to be limited to those alternatives and described embodiments.

CORRECTED ADS FORM

Application Number	16201903
Title of Invention	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES

Inventor Information

****If no data is shown, no data has been corrected****

	Data of Record	Updated Data
Order Number		
Name		

Residence Information

Residency		
City		
State		
Country of Residence		

Mailing Address of Inventor

Address 1		
Address 2		
City,State/Province, Postal Code		
Country		



Application Information

	Data of Record	Updated Data
Title of Invention	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES	
Attorney Docket Number	67838.00217	
Entity Type	Regular Undiscounted	<u>Small</u>

Domestic Benefit/National Stage Information

****If no data is shown, no data has been corrected****

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121,365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S. C. 119(e) or 120, and 37 CFR 1.78(a).

	Data of Record	Updated Data
Prior Application Status		<u>patented</u>
Application Number		
Continuity Type		<u>CON</u>
Prior Application Number		<u>15139272</u>
Filing Date (YYYY-MM-DD)		<u>2016-04-26</u>
Patent Number		<u>10137741</u>
Issue Date (YYYY-MM-DD)		<u>2018-11-27</u>



		Data of Record	Updated Data
	Prior Application Status		<u>expired</u>
	Application Number		<u>15139272</u>
	Continuity Type		<u>PRO</u>
	Prior Application Number		<u>62153441</u>
	Filing Date (YYYY-MM-DD)		<u>2015-04-27</u>
	Patent Number		
	Issue Date (YYYY-MM-DD)		

Foreign Priority Information

****If no data is shown, no data has been corrected****

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

		Data of Record	Updated Data
	Application Number		
	Country		
	Filing Date		
	Access Code		

Applicant Information

****If no data is shown, no data has been corrected****

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.

	Data of Record	Updated Data
Applicant Type		

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		
Applicant is an Organization		
Name		
Organization Name		
Address 1		
Address 2		
City,State/Province,Postal Code		
Country		
Phone Number		
Fax Number		
Email Address		

Assignee Information including Non-Applicant Assignee Information

****If no data is shown, no data has been corrected****
Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office

	Data of Record	Updated Data
Order		
Applicant is an Organization		
Name		

Organization Name		
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Mailing Address

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

Signature

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b).

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	/Grant T. Langton/	Registration Number	39739
First Name	Grant T.	Last Name	Langton

Electronic Acknowledgement Receipt

EFS ID:	34414187
Application Number:	16201903
International Application Number:	
Confirmation Number:	1052
Title of Invention:	DISPLAY ASSEMBLIES AND METHODS FOR APPLYING THE SAME TO VULCANIZED RUBBER ARTICLES
First Named Inventor/Applicant Name:	
Customer Number:	125632
Filer:	Grant T. Langton/Lauren Coyle
Filer Authorized By:	Grant T. Langton
Attorney Docket Number:	67838.00217
Receipt Date:	27-NOV-2018
Filing Date:	
Time Stamp:	21:06:20
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	Application Data Sheet to update/ correct info	CorrectedADS.pdf	70647	no	5
			11521e3857e70504502ac370b3f012e7d14 affd0		

Warnings:

Information:	
Total Files Size (in bytes):	70647
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