I4F Exhibit 1003

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/052,836	08/23/2022	11421425	A676-3	7468

20999 7590 08/03/2022

HAUG PARTNERS LLP
745 FIFTH AVENUE - 10th FLOOR
NEW YORK, NY 10151

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

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

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

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

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

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

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

Bobby Markovski, Helsingborg, SWEDEN;
Bengt Rosander, Deceased, SWEDEN;
Magnus Persson, Helsingborg, SWEDEN;

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

VILOX AB, Helsingborg, SWEDEN;

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

PART B - FEE(S) TRANSMITTAL

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

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

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

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

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

20999 7590 06/10/2022

HAUG PARTNERS LLP
745 FIFTH AVENUE - 10th FLOOR
NEW YORK, NY 10151

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

Certificate of Mailing or Transmission

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/052,836	11/04/2020	Bobby Markovski	A676-3	7468

TITLE OF INVENTION: JOINING SYSTEM FOR FLOOR PANELS

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	09/12/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, CHI Q	3635	052-588100

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/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 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 Seth Natter
2 Haug Partners LLP
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: Vilox AB

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Helsingborg, Sweden

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. 50-0320

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 /Seth Natter/ Date July 11, 2022

Typed or printed name Seth Natter Registration No. 25122

I4F Exhibit 1003 - 2

Electronic Patent Application Fee Transmittal

Application Number:	17052836
Filing Date:	04-Nov-2020
Title of Invention:	JOINING SYSTEM FOR FLOOR PANELS
First Named Inventor/Applicant Name:	Bobby Markovski
Filer:	SETH NATTER/Shabana Alli-Arjune
Attorney Docket Number:	A676-3

Filed as Small Entity

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

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	2501	1	600	600

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

Electronic Acknowledgement Receipt	
EFS ID:	46159703
Application Number:	17052836
International Application Number:	
Confirmation Number:	7468
Title of Invention:	JOINING SYSTEM FOR FLOOR PANELS
First Named Inventor/Applicant Name:	Bobby Markovski
Customer Number:	20999
Filer:	SETH NATTER/Shabana Alli-Arjune
Filer Authorized By:	SETH NATTER
Attorney Docket Number:	A676-3
Receipt Date:	11-JUL-2022
Filing Date:	04-NOV-2020
Time Stamp:	16:00:19
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$600
RAM confirmation Number	E20227AG00400166
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)	85B.pdf	1735797 41348a6ffb012385af4efa6541be73bca4b59500	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	37930 ac952a95485e3854d4492ca6cfe948f1b1eab2d8	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1773727		

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

20999 7590 06/10/2022

HAUG PARTNERS LLP
745 FIFTH AVENUE - 10th FLOOR
NEW YORK, NY 10151

EXAMINER	
NGUYEN, CHI Q	
ART UNIT	PAPER NUMBER
3635	

DATE MAILED: 06/10/2022

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/052,836	11/04/2020	Bobby Markovski	A676-3	7468

TITLE OF INVENTION: JOINING SYSTEM FOR FLOOR PANELS

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	09/12/2022

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

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

HOW TO REPLY TO THIS NOTICE:

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

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

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

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

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. 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.

PTOL-85 (Rev. 02/11)

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)

20999 7590 06/10/2022

HAUG PARTNERS LLP
745 FIFTH AVENUE - 10th FLOOR
NEW YORK, NY 10151

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

Certificate of Mailing or Transmission

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/052,836	11/04/2020	Bobby Markovski	A676-3	7468

TITLE OF INVENTION: JOINING SYSTEM FOR FLOOR PANELS

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	09/12/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, CHI Q	3635	052-588100

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/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

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

1_____
2_____
3_____

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

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

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

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

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

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

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

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

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

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

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

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

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

I4F Exhibit 1003 - 8

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/052,836	11/04/2020	Bobby Markovski	A676-3	7468

20999 7590 06/10/2022

HAUG PARTNERS LLP
745 FIFTH AVENUE - 10th FLOOR
NEW YORK, NY 10151

EXAMINER	
NGUYEN, CHI Q	
ART UNIT	PAPER NUMBER
3635	

DATE MAILED: 06/10/2022

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.

PTOL-85 (Rev. 02/11)

I4F Exhibit 1003 - 9

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

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

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

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

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

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

Notice of Allowability	**Application No.** 17/052,836	**Applicant(s)** Markovski et al.	
	Examiner CHI Q NGUYEN	**Art Unit** 3635	**AIA (FITF) Status** Yes

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

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

1. ☑ This communication is responsive to amendment filed on 5/27/2022.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-15 . 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 5/27/2022.
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 _____.

/CHI Q NGUYEN/
Primary Examiner, Art Unit 3635

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/052,836	Markovski et al.
	Examiner	Art Unit
	CHI Q NGUYEN	3635

CPC - Searched*		
Symbol	**Date**	**Examiner**
(e04f15/02033 OR e04f15/02038 OR e04f15/107 OR e04f15/102 OR e04f2201/042 OR e04f2201/0107 OR e04f2201/03 OR e04f15/02038 OR e04f2201/0552 OR e04f2201/023 OR e04f2201/0535 OR e04f2201/0146 OR e04f2201/043 OR e04f2201/0547 OR e04f2201/0153 OR e04f2201/0138 OR e04f2201/042).cpc.	12/02/2021	CN

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

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**
52	592.1, 592.3,592.2,578,588.1,309.1,309.3	12/02/2021	CN

* 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**
PALM inventor name; BRS and related arts FW/BW search	12/02/2021	CN
Update search	03/31/2022	CN

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
	(floor and panel and groove and tongue and recess).clm.	03/31/2022	CN

/CHI Q NGUYEN/ Primary Examiner, Art Unit 3635	

I4F Exhibit 1003 - 12

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/052,836	Markovski et al.
	Examiner	**Art Unit**
	CHI Q NGUYEN	3635

CPC							
Symbol						**Type**	**Version**
E04F	/	15	/	02038		F	2013-01-01
E04F	/	2201	/	0107		A	2013-01-01
E04F	/	2201	/	0153		A	2013-01-01
E04F	/	2201	/	023		A	2013-01-01
E04F	/	2201	/	043		A	2013-01-01

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

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	15	
/CHI Q NGUYEN/ Primary Examiner, Art Unit 3635	03 June 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20220603

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/052,836	Markovski et al.
	Examiner	**Art Unit**
	CHI Q NGUYEN	3635

INTERNATIONAL CLASSIFICATION				
CLAIMED				
E04B	/	2	/	00

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

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

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	15	
/CHI Q NGUYEN/ Primary Examiner, Art Unit 3635	03 June 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20220603

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/052,836	Markovski et al.
	Examiner	**Art Unit**
	CHI Q NGUYEN	3635

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

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	11	10												
2	2	4	11												
3	3	12	12												
5	4	13	13												
6	5	14	14												
7	6	15	15												
8	7														
9	8														
10	9														

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	15	
/CHI Q NGUYEN/ Primary Examiner, Art Unit 3635	03 June 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20220603

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	10	"20170016235"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/03 03:08 PM
L2	40	(Artificial Intelligence) More Like: US-20170016235-A1 Text: (CN-102803625-A OR CN-102803625-B OR CA-2786529-A1 OR EP-2524090-A1 OR CN-111655949-A OR CA-3083710-C OR WO-2019101928-A1 OR CA-2786529-C OR ES-2206205-T3 OR CA-3083710-A1 OR ES-2671146-T3 OR CN-111877676-A OR RU-2668427-C1 OR CA-2961989-A1 OR DE-102014114250-A1 OR DE-202014010455-U1 OR DE-202014010455-U9 OR ES-2902135-T3 OR CN-106856662-B OR CA-2961989-C).did.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/03 03:08 PM
L3	2	("2017/0016235").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/06/03 03:10 PM
L4	17	("9366036" | "9464444" | "9725912" | "20070006543" | "20100300029" | "20110271632" | "20140033636" | "20140130437" | "20150176289" |	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/06/03 03:10 PM

I4F Exhibit 1003 - 16

		"20150300029" | "20160069087" | "20160288447" | "20170016235" | "20170165936" | "20180179763" | "20180274246" | "20180298618").pn. OR ("10422143").urpn. AND (PGPB | USPT | USOC).dbnm.					

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

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

PTO/SB/08a and 08b (09-08)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if known	
Application Number	17/052,836
Filing Date	November 4, 2020
First Named Inventor	Bobby Markovski et al.
Art Unit	3635
Examiner Name	Chi Q. Nguyen
Attorney Docket Number	A676-3

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document
	1.	US-2017/0016235 A1	01-19-2017	Hannig et al.
	2.			
	3.			
	4.			
	5.			

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Translation[6]
	6.	CN 106856662A	06-16-2017	AKZENTA PANEELE + PROFILE GMBH	English Abstract
	7.				
	8.				
	9.				
	10.				

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
	11.	Office Action mailed on December 3, 2021 in corresponding Chinese Application No. 201980029338.0.
	12.	
	13.	

Examiner Signature	/CHI Q NGUYEN/	Date Considered	06/03/2022

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BIB DATA SHEET

CONFIRMATION NO. 7468

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
17/052,836	11/04/2020	052	3635	A676-3

APPLICANTS
VILOX AB, Helsingborg, SWEDEN;

INVENTORS
Bobby Markovski, Helsingborg, SWEDEN;
Bengt Rosander, Deceased, SWEDEN;
Magnus Persson, Helsingborg, SWEDEN;

**** CONTINUING DATA ***************************
This application is a 371 of PCT/EP2019/061431 05/03/2019

**** FOREIGN APPLICATIONS ***************************
SWEDEN 1830152-3 05/04/2018

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **** ** SMALL ENTITY **
04/28/2021

Foreign Priority claimed ☑ Yes ☐ No 35 USC 119(a-d) conditions met ☑ Yes ☐ No Verified and Acknowledged /CHI Q NGUYEN/ Examiner's Signature	☐ Met after Allowance CN Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		SWEDEN	4	15	1

ADDRESS
HAUG PARTNERS LLP
745 FIFTH AVENUE - 10th FLOOR
NEW YORK, NY 10151
UNITED STATES

TITLE
JOINING SYSTEM FOR FLOOR PANELS

FILING FEE RECEIVED		
910	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if known	
Application Number	17/052,836
Filing Date	November 4, 2020
First Named Inventor	Bobby Markovski et al.
Art Unit	3635
Examiner Name	Chi Q. Nguyen
Attorney Docket Number	A676-3

U.S. PATENT DOCUMENTS

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	2.			
	3.			
	4.			
	5.			

FOREIGN PATENT DOCUMENTS

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	6.	CN 106856662A	06-16-2017	AKZENTA PANEELE + PROFILE GMBH	English Abstract
	7.				
	8.				
	9.				
	10.				

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
	11.	Office Action mailed on December 3, 2021 in corresponding Chinese Application No. 201980029338.0.
	12.	
	13.	

Examiner Signature		Date Considered	

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Espacenet

Bibliographic data: CN106856662 (A) — 2017-06-16

Panel

Inventor(s): HANNIG HANS-JURGE; SCHAFERS ERICH ± (H-J·汉尼希, ; E·舍费尔)

Applicant(s): AKZENTA PANEELE + PROFILE GMBH ± (阿卡曾塔板材型材有限公司)

Classification: - international: *E04F15/02*
- cooperative: **A61F5/56 (EP); E04C2/38 (US); E04F13/0894 (US); E04F15/02033 (EP, CN, RU, US); E04F15/02038 (EP, CN, US); E04F15/102 (US);** E04F2201/0153 (EP, CN, US); E04F2201/042 (EP, CN, US)

Application number: CN20158022130 20150930 Global Dossier

Priority number(s): DE201410114250 20140930 ; WO2015EP72564 20150930

Also published as: CN106856662 (B) CA2961989 (A1) CA2961989 (C) DE102014114250 (A1) DE202014010455 (U1) more

Abstract of CN106856662 (A)

The invention relates to a panel having at least one pair of complementary locking means (2, 2`) on opposite panel edges (1, 1`), wherein the locking means (2, 2`) are configured as form-fitting holding profiles (3, 3`) with a locking groove (4) and with a complementary locking tongue (5), respectively, wherein the panel surface (S, S`) has a chamfer (K1, K2) at least at the periphery of one of the holding profiles (3, 3`), with the proviso that that holding profile (3, 3`) provided with the chamfer (K1, K2) is provided, beneath the chamfer (K1, K2), with an upper abutment face (8, 9), and the complementary holding profile (3, 3`) is provided with a complementary upper abutment face (8, 9) that is arranged substantially parallel thereto, and wherein a butt joint (T) is producible by the two abutment faces (8, 9) being in contact with one another, wherein the butt joint (T) is inclined relative to the panel surface (S, S`) and, to this end, one of the abutment faces (8, 9) is assigned to a tongue (5, 20) and is inclined downwards in the direction of the free end of the tongue (5, 20) in question, and the complementary upper abutment face (8, 9) is assigned to a groove (4, 21) and is inclined downwards in the direction of the bottom of the groove (4, 21) in question.

I4F Exhibit 1003 - 21

(19)中华人民共和国国家知识产权局

(12)发明专利申请

(10)申请公布号 CN 106856662 A
(43)申请公布日 2017.06.16

(21)申请号 201580022130.8

(22)申请日 2015.09.30

(30)优先权数据
102014114250.0 2014.09.30 DE

(85)PCT国际申请进入国家阶段日
2016.10.26

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PCT/EP2015/072564 2015.09.30

(87)PCT国际申请的公布数据
WO2016/050848 DE 2016.04.07

(71)申请人 阿卡曾塔板材型材有限公司
地址 德国凯撒塞谢

(72)发明人 H-J·汉尼希 E·舍费尔

(74)专利代理机构 中国国际贸易促进委员会专利商标事务所 11038
代理人 俄旨淳

(51)Int.Cl.
E04F 15/02(2006.01)

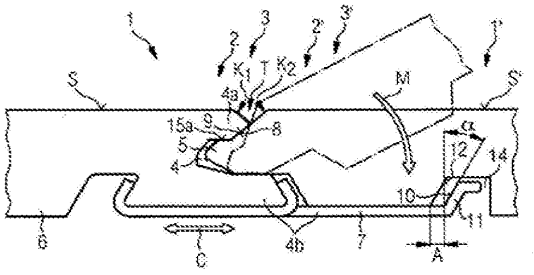
权利要求书2页 说明书19页 附图17页

(54)发明名称

板块

(57)摘要

本发明涉及一种板块，所述板块在相对置的板块边缘(1、1')上具有至少一对互补的锁定机构(2、2')，其中锁定机构(2、2')设计成具有锁定槽(4)或互补的锁定键(5)的形锁合的保持成形部(3、3')，板块表面(S、S')至少在一个所述保持成形部(3、3')的边缘上以这样的方式具有倒棱(K_1、K_2)，使得设有倒棱(K1、K2)的保持成形部(3、3')在倒棱(K_1、K_2)下方分别设有上对接面(8、9)，互补的保持成形部(3、3')设有与所述上对接面基本上平行设置的互补的上对接面(8、9)，通过相互接触的两个对接面(8、9)能形成对接缝(T)，其中，对接缝(T)相对于板块表面(S、S')是倾斜的，并且为此目的其中一个对接面(8、9)配设给一个键(5、20)并朝相关键(5、20)的自由端的方向向下倾斜，而互补的上对接面(8、9)配设给一个槽(4、21)并且朝相关槽(4、21)的底部的方向向下倾斜。



CN 106856662 A

1.板块，所述板块在相对置的板块边缘(1、1')上具有至少一对互补的锁定机构(2、2')，其中所述锁定机构(2、2')设计成形锁合的保持成形部(3、3')，所述保持成形部具有锁定槽(4)或互补的锁定键(5)，板块表面(S、S')至少在一个所述保持成形部(3、3')的边缘上以这样的方式具有倒棱(K_1、K_2)，使得设有倒棱(K_1、K_2)的保持成形部(3、3')在倒棱(K_1、K_2)下方分别设有上对接面(8、9)，互补的保持成形部(3、3')设有与所述上对接面基本上平行设置的互补的上对接面(8、9)，通过两个相互接触的对接面(8、9)能形成对接缝(T)，其特征在于，对接缝(T)相对于板块表面(S、S')是倾斜的，并且为此目的其中一个对接面(8、9)配设给一个键(5、20)并朝相关键(5、20)的自由端的方向向下倾斜，而互补的上对接面(8、9)配设给一个槽(4、21)并且朝相关槽(4、21)的底部的方向向下倾斜。

2.根据权利要求1所述的板块，其特征在于，互补的保持成形部(3、3')设计成，使得所述保持成形部能够通过摆动运动(M)形锁合地连接，在两个相连的板块边缘(1、1')的板块表面(S、S')上能够这样形成闭合的对接缝(T)，使得通过相互接触的所述两个对接面(8、9)限定活动范围(X)的第一区间末端，并且所述活动范围是针对板块边缘相对于彼此的以及沿既垂直于形锁合地连接的板块边缘又平行于连接的板块的平面的运动方向的运动，每个所述保持成形部(3、3')分别具有一个下止挡面(10、12)，当上对接面(8、9)相互接触并且对接缝(T)闭合时，所述止挡面相互隔开最大的间距，下止挡面(10、12)之间的最大间距确定活动范围(X)的尺寸，当下止挡面(10、12)相互接触时，限定所述活动范围(X)的第二区间末端。

3.根据权利要求1或2的板块，其特征在于，在具有锁定键(5)的保持成形部(3')的边缘上设有倒棱(K_2)，所述倒棱(K_2)构造成倒角(16)，所述倒角(16)朝锁定键的自由端向下倾斜，并且该保持成形部(3')的上对接面(9)同样朝锁定键(5)的自由端向下倾斜，上对接面(9)的斜角小于或等于或大于倒角(16)的斜角。

4.根据权利要求1至3之一所述的板块，其特征在于，锁定键(5)的键上侧(15)相对于板块表面(S、S')是倾斜的，并且所述键上侧(15)和上对接面(9)合并为共同的面，锁定槽(4)在其上槽壁(4a)的内侧(22)上同样相对于板块表面(S、S')是倾斜的，并且其斜度与锁定键的上对接面(9)的斜度相适配。

5.根据权利要求1至4之一所述的板块，其特征在于，锁定槽(4)具有下槽壁(4b)，在下槽壁的自由端上设有指向板块上侧(S、S')的保持边缘(11)，锁定槽(4)的下止挡面(10)设置在下槽壁(4b)的保持边缘(11)上，下止挡面(10)的垂线向内指向锁定槽(4)的槽底部。

6.根据权利要求1至5之一所述的板块，其特征在于，在各下止挡面(10、12)中，至少锁定槽(4)的下止挡面(10)相对于板块表面(S、S')垂直设置。

7.根据权利要求1至6之一所述的板块，其特征在于，锁定键(5)的键下侧(13)具有下接触面(13a)，而锁定槽(4)的下槽壁(4b)设有用于锁定键(5)的下接触面(13a)的支承面(19a)，锁定键(5)的下接触面(13a)平行于板块表面(S、S')设置，而支承面(19a)同样平行于板块表面(S、S')延伸。

8.根据权利要求7所述的板块，其特征在于，锁定键(5)的键下侧(13)至少在下接触面(13a)的两个端部之一上具有升高的区域(13a、13d)。

9.根据权利要求1至8之一所述的板块，其特征在于，带有锁定键(5)的保持成形部(3')在锁定键(5)的上方具有封闭槽(21)，带有锁定槽(4)的互补的保持成形部(3)以其上槽壁

I4F Exhibit 1003 - 23

(4a)的自由端构成封闭键(20)，所述封闭键能嵌入所述封闭槽(21)中。

10.根据权利要求9所述的板块，其特征在于，设有封闭键(20)的板块边缘(1)的上对接面(8)设置在封闭键(20)的键上侧上，设有封闭槽(21)的板块边缘(1')的上对接面(9)设置在封闭槽(21)的上槽壁上。

I4F Exhibit 1003 - 24

板块

技术领域

[0001] 本发明涉及一种板块，在相对置的板块边缘上具有至少一对互补的锁定机构，所述锁定机构设计成具有锁定槽或具有锁定键的形锁合的保持成形部，板块表面至少在一个所述保持成形部的边缘上具有这样的倒棱，使得设有倒棱的保持成形部在倒棱下方设有上对接面，并且互补保持成形部设有与其基本上平行设置的互补的上对接面，通过两个相互接触的对接面能形成对接缝。

背景技术

[0002] 利用这种板块例如制造地面覆层，特别是适用于浮动铺设的地面覆层。所述板块通常具有装饰性的表面。

[0003] 由DE 20 2008 011 589已知一种所述类型的板块，所述板块具有上对接面，在这些对接面之间可以形成间隙。这里提出一种倒棱，与由没有倒棱的板块组成的地面覆层相比，所述倒棱使得所形成的间隙不太引人注意，所述没有倒棱的板块形成平坦地表面，从而使得间隙显得明显可见。通过板块的倒棱例如形成V形接缝。此时，间隙没有表现在板块表面上，而是位于这种V形接缝的最深的位置处，并且此时根据具体的从上面的观察方向间隙对于观察者甚至是完全不可见的。由此由于V形接缝或者倒棱，与由没有倒棱的板块组成的地面覆层和间隙在地面覆层的表面上明显可见的情况相比，地面覆层的外观受到的破坏较小。

发明内容

[0004] 利用本发明应进一步改进这种倒棱对于地面覆层的外观带来有利的效果。

[0005] 根据本发明所述目的这样来实现，即，所述对接缝相对于板块表面是倾斜的，为此目的，其中一个对接面配设给键并朝相关键的自由端向下倾斜，并且互补的上对接面配设给槽并朝相关槽的底部的方向向下倾斜。

[0006] 如果两个板块相互锁定，则彼此相对的对接面以相对于板块表面的垂线的一定斜度延伸。上对接面优选相互平行地设置。当对接缝闭合时，通过这种平行设置的对接面面式地接触。对接面相互贴靠。如果两个锁定的板块相互运动分开并且在对接面之间形成间隙，则这种间隙的宽度(间隙尺寸)始终小于板块相互运动分开的相关水平位移行程。在三角法上，板块的位移行程可以看作是一个直角三角形的斜边，而间隙尺寸此时相当于这个三角形的直角边。有利的是，与现有技术相比，这种变窄的间隙对地面覆层的外观的破坏程度较小。另一个优点是，两个对接面之一对于观察者来说始终是被遮蔽的并且是根本不可见的。另一个对接面由于其相对于板块表面的垂线的斜度不允许向间隙深处观察。所述斜度越小，则可能的向间隙中的观察深度就越小。

[0007] 此外，变窄的间隙还具有另一个优点，就是说，这是因为与具有较大宽度的间隙相比，污物更难以进入。

[0008] 本发明设定为用于具有载体板或具有由木材或由经再加工的木质材料制成的主

I4F Exhibit 1003 - 25

体的板块，但也可以用于具有由塑料或由木材-塑料复合材料、即木材颗粒复合体(WPC)制成的主体的板块。在复合材料中，木材也可以用有机的和/或矿物的填充材料替代或补充这种材料，例如石粉、灰烬、炭黑、粉碎的植物性组成部分，如米糠、竹组分、软木组分等。由复合材料组成的载体板或由木材-塑料复合材料组成的载体板可以包括多个层，这些层具有不同的组成和不同的特性，例如包括具有缓冲特性的弹性层或者能影响湿度的透过性的扩散层或闭锁层等。

[0009] 如果载体板由复合材料或由木材-塑料复合材料制成，并且由这种载体板生产板块，则在板块的生命周期开始时可能会出现生长，这种生长(Wachstum)是由于吸收了一定的水分导致的。但对于水分最大的吸收能力是有限的并且根据载体板的具体组成而是不同的。一旦板块达到了水分的一定饱和度，则形成一种生长状态，这种生长状态接下来仅能在较小的界限内变化并且这种变化主要是由于天气变化引起的。环境温度以及现场环境中的空气湿度的编号影响板块的尺寸并且可能导致一定的收缩或一定的膨胀。

[0010] 如果地面覆层由这种板块组成，则这种板块构成地板块。单个板块的一定的收缩或膨胀发生累积并导致地板总体上的收缩或膨胀。在锁定的板块边缘内部的活动范围有利地这样设计尺寸，使得在理想情况下所有板块都能够在不向相邻板块中传递明显拉力的情况最大程度地收缩。就是说，对于每个板块提供了足够的空间，以便能够以这样的程度膨胀或收缩，所述程度一方面对于避免地面覆层起鼓是必要的，另一方面对于避免形成超过间隙B的最大尺寸并可能破坏板块边缘的间隙是必要的。

[0011] 如果主体至少部分地由塑料制成，则得到由塑料或由木材-塑料复合材料(WPC)组成的主体的设计方案。载体板或主体例如由热塑性、弹性体或热固性的塑料构成。此外，在本发明的范围内可以使用由所提及的材料组成的回收利用材料。这里优选使用板材，特别是由热塑性塑料制成的板材，如聚氯乙烯、聚烯烃，例如聚乙烯(PE)、聚丙烯(PP)、聚酰胺(PA)、聚氨酯(PU)、聚苯乙烯(PS)、丙烯腈-丁二烯-苯乙烯共聚物(ABS)、聚甲基丙烯酸甲酯(PMMA)、聚碳酸酯(PC)、聚对苯二甲酸乙二醇酯(PET)、聚醚醚酮(PEEK)或其混合物或共聚物。这里可以与载体板的基本材料无关地设有例如软化剂，所述软化剂可以大致以按重量≥0％至按重量≤20％、特别是按重量≤10％、优选按重量≤7％的范围存在，例如以按重量≥5％至按重量≤10％的范围存在。合适的软化剂例如包括由BASF公司以商品名“Dinsh”销售的软化剂。此外，作为传统软化剂的替代品可以设置共聚物，例如丙烯酸酯或甲基丙烯酸甲酯。

[0012] 特别是热塑性塑料也提供了这样的优点，即由这种塑料制成的产品可以特别容易地回收利用。也可以使用其他来源的回收材料。由此得到另一种降低制造成本的可能性。

[0013] 这种载体板这里具有很高的弹性或弹力，这使得在踩踏时可以得到非常舒适的感觉，并且相对于传统的材料在踩踏时还降低了所出现的噪声，因此可以实现更好的踩踏隔音。

[0014] 此外，所述的载体板还实现了良好防水性的优点，因为这种载体板具有1％或更小的浸涨。除了纯塑料载体以外，这一点出人意料地也适用于WPC材料，如下面还要详细说明的那样。载体材料特别有利地可以具有木材-聚合物材料(Wood Plastic Composite，WPC)或者由这种材料组成。这里例如以40/60至70/30、例如50/50的比例存在的木材和聚合物是适当的。作为聚合物组成成分例如可以使用聚丙烯、聚乙烯或这两种材料的共聚物。这种材

I4F Exhibit 1003 - 26

料提供了这样的优点，即所述材料在较低的温度下、如例如在≥180℃至≤200℃的范围内的温度下就已经能用规定的方法成形为载体板，从而可以实现特别高效的工艺过程，例如具有在6m/min的线速度的工艺过程。例如对于具有50/50的木材和聚合物比例分配的WPC产品在例如产品厚度为4.1mm时可以实现这种工艺过程，这可以实现特别高效的制造过程。

[0015] 此外还可以由此制造特别稳定的板块，所述板块还具有高弹性，这特别是对于实现载体板的边缘区域上的连接元件的有效和经济的设计方案以及还在踩踏隔音(Trittschalldämmung)方面可能是有利的。此外对于这种WPC材料还可以以低于1％的浸涨实现前面所述的良好水相容性。还可以这里WPC材料例如可以具有稳定剂和/或其他添加剂，所述稳定剂和/或添加剂优选存在于塑料成分中。

[0016] 此外可能有利的是，载体板包括基于PVC的材料或由这种材料组成。这种材料也可以特别有利地用于高级的板块，这种板块例如也可以毫无问题地用于潮湿空间中。此外，用于载体板的基于PVC的材料还适于实现特别高效的制造工艺，因为这里在材料厚度例如为4.1mm时能实现例如8m/min的线速度，这使得可以实现特别高效的制造工艺。此外，这种载体板还具有有利的弹性和水相容性，这也可以实现前面所述的优点。

[0017] 对于基于塑料的板块，如基于WPC的板块，这里矿物的填充材料是有利的。这里特别合适的例如是滑石，或者还有碳酸钙(白垩)、氧化铝、硅胶、石英粉、木屑、石膏。例如可以设置在按重量≥30％至按重量≤70％的范围内的白垩，其中，通过这种填充材料，特别是通过白垩，能够改进载体板的滑动。也可以用已知的方式对载体板进行着色。特别是可以设定，载体板的材料具有防火剂。

[0018] 根据本发明的一个特别优选的实施形式，载体板的材料由PE/PP嵌段共聚物与木材的混合物组成，这里PE/PP嵌段共聚物的比例和木材的比例可以在按重量≥45％至按重量≤55％之间。此外，载体板的材料可以具有按重量≥0％至按重量≤10％之间的其他添加剂，如例如流动助剂、热稳定剂或UV稳定剂。木材的颗粒尺寸这里在>0μm至≤600μm之间，优选的颗粒尺寸分布D50为400μm。这里，载体板的材料特别是可以具有颗粒尺寸分布D10为400μm的木材。这里颗粒尺寸分布涉及体积直径并且与颗粒的体积相关。这里特别优选地提供成粒或成丸的预挤出的、由PE/PP嵌段共聚物和木材颗粒组成的，具有所给出的颗粒尺寸分布的混合物作为载体板的材料。颗粒和/或丸粒这里优选例如可以具有在≥400μm至≤10mm，优选≥600μm至≤10mm，特别是≥800μm至≤10mm的粒度。

[0019] 根据本发明另一个特别优选的实施形式，载体板由PE/PP混合共聚物与木材的混合物组成。这里PE/PP混合共聚物的比例以及木材的比例可以在按重量≥45％至按重量≤55％之间。此外，载体板的材料可以具有按重量≥0％至按重量≤10％之间的其他添加剂，如例如流动助剂、热稳定剂或UV稳定剂。木材的颗粒尺寸这里在>0μm至≤600μm之间，优选的颗粒尺寸分布D50为400μm。这里，载体板的材料特别是可以具有颗粒尺寸分布D10为400μm的木材。这里颗粒尺寸分布涉及体积直径并且与颗粒的体积相关。这里特别优选地提供成粒或成丸的预挤出的、由PE/PP混合共聚物和木材颗粒组成的、具有所给出的颗粒尺寸分布的混合物作为载体板的材料。颗粒和/或丸粒这里优选例如可以具有在≥400μm至≤10mm，优选≥600μm至≤10mm，特别是≥800μm至≤10mm的粒度。

[0020] 在本发明的另一个实施形式中，载体板的材料由PP均聚物与木材的混合物组成。这里PP均聚物的比例以及木材的比例可以在按重量≥45％至按重量≤55％之间。此外，载

I4F Exhibit 1003 - 27

体板的材料可以具有按重量≥0%至按重量≤10%之间的其他添加剂，如例如流动助剂、热稳定剂或UV稳定剂。木材的颗粒尺寸这里在>0μm至≤600μm之间，优选的颗粒尺寸分布D50为400μm。这里，载体板的材料特别是可以具有颗粒尺寸分布D10为400μm的木材。这里颗粒尺寸分布涉及体积直径并且与颗粒的体积相关。这里特别优选地提供成粒或成丸的预挤出的、由PP均聚物和木材颗粒组成的、具有所给出的颗粒尺寸分布的混合物作为载体板的材料。颗粒和/或丸粒这里优选例如可以具有在≥400μm至≤10mm，优选≥600μm至≤10mm，特别是≥800μm至≤10mm的粒度。在本发明的另一个实施形式中，载体板的材料由PVC聚合物与白垩的混合物组成。这里PVC聚合物的比例以及白垩的比例可以在按重量≥45%至按重量≤55%之间。此外，载体板的材料可以具有按重量≥0%至按重量10%之间的其他添加剂，如例如流动助剂、热稳定剂或UV稳定剂。白垩的颗粒尺寸这里在>0μm至≤600μm之间，优选的颗粒尺寸分布D50为400μm。这里，载体板的材料特别是可以具有颗粒尺寸分布D10为400μm的白垩。这里颗粒尺寸分布涉及体积直径并且与颗粒的体积相关。这里特别优选地提供成粒或成丸的预挤出的、由PVC聚合物和白垩组成的、具有所给出的颗粒尺寸分布的混合物作为载体板的材料。颗粒和/或丸粒这里优选例如可以具有在≥400μm至≤10mm，优选≥600μm至≤10mm，特别是≥800μm至≤10mm的粒度。

[0021] 在本发明的另一个实施形式中，载体板的材料由PVC聚合物与木材的混合物组成。这里PVC聚合物的比例以及木材的比例可以在按重量≥45%至按重量≤55%之间。此外，载体板的材料可以具有按重量≥0%至按重量≤10%之间的其他添加剂，如例如流动助剂、热稳定剂或UV稳定剂。木材的颗粒尺寸这里在>0μm至≤600μm之间，优选的颗粒尺寸分布D50为400μm。这里，载体板的材料特别是可以具有颗粒尺寸分布D10为400μm的木材。这里颗粒尺寸分布涉及体积直径并且与颗粒的体积相关。这里特别优选地提供成粒或成丸的预挤出的、由PVC聚合物和木材颗粒组成的、具有所给出的颗粒尺寸分布的混合物作为载体板的材料。颗粒和/或丸粒这里优选例如可以具有在≥400μm至≤10mm，优选≥600μm至≤10mm，特别是≥800μm至≤10mm的粒度。

[0022] 可以采用公知的方法、如例如激光衍射法来确定颗粒尺寸分布，利用这种方法可以在几纳米至多个毫米的范围内的颗粒尺寸。由此也可以确定D50或D10的值，所述值表示50%或10%的所测量的颗粒小于所给出的值。

[0023] 根据本发明的另一个实施形式，载体材料具有一种具有塑料的基体材料和一种固体材料，所述固体材料关于所述固体材料至少按重量50%、特别是至少按重量80%、特别优选至少按重量95%由滑石粉构成。这里基体材料相对于载体材料以按重量≥30%至按重量≤70%、特别是按重量≥40%至按重量≤60%的量存在，而所述固体材料相对于载体材料以按重量≥30%至按重量≤70%、特别是按重量≥40%至按重量≤60%、例如小于或等于按重量50%的量存在。此外设定，基体材料和固体材料一起相对于载体材料以按重量≥95%、特别是≥99%的量存在。

[0024] 在本发明的这个实施形式中，固体材料相对于所述固体材料至少按重量50%、特别是至少按重量80%、特别优选至少按重量100%由滑石粉构成。滑石粉这里按本身已知的方式是指水合硅酸镁，这种物质例如可以具有化学总式[Mg3Si4O10(OH)2]。因此所述固体材料有利地至少大部分由矿物物质滑石粉构成，这种物质例如可以作为粉末形式使用或者可以以颗粒的形式存在于载体材料中。原则上固体材料可以由粉末状的固体组成。

I4F Exhibit 1003 - 28

[0025] 可能有利的是，滑石粉颗粒根据BET，ISO 4652的比面密度在≥4m²/g至≤8m²/g的范围内，例如在≥5m²/g至≤7m²/g的范围内。

[0026] 此外可能有利的是，滑石粉以按DIN 53468在≥0.15g/cm³至≤0.45g/cm³的范围内，例如在≥0.25g/cm³至≤0.35g/cm³的范围内的堆积密度(Schüttdichte)存在。

[0027] 在本发明的这种实施形式中，基体材料特别是用于在制造完成的载体中容纳或埋入固体材料。所述基体材料这里具有塑料或塑料混合物。特别是对于下面还要详细说明的制造方法而言，可能有利的是，基体材料具有热塑性塑料。由此实现了，载体材料或载体材料的组成成分具有这样的熔点或软化点，使得载体材料在进一步的方法步骤中能通过热作用成形，如下面参考方法详细说明的那样。基体材料特别是可以由塑料或塑料混合物和必要时还有增附剂制成。这些组分优选可以为载体材料的至少按重量90％、特别优选至少按重量95％，特别是至少按重量99％。

[0028] 此外可以设定，在基体材料相对于载体材料以按重量≥30％至按重量≤70％、特别是按重量≥40％至按重量≤60％的量存在。此外设定，固体材料相对于载体材料以按重量≥30％至按重量≤70％、特别是按重量≥40％至按重量≤60％的量存在。

[0029] 聚丙烯特别适于用作基体材料，因为这种材料一方面能够经济地购得，并且作为热塑性材料具有良好的作用基体材料的特性，以便埋入固体材料。这里，特别是由均聚物和共聚物组成的混合物对于基体材料可以实现特别有利的特性。这种材料此外还提供了这样的优点，即在较低的温度下，例如在≥180℃至≤200℃范围内的温度下就已经能够按预先规定的方法成形为载体，从而可以实现特别高效的、例如具有在6m/min范围的线速度的工艺过程。

[0030] 此外可能有利的是，均聚物具有在≥30Mpa至≤45Mpa的范围内，例如在≥35Mpa至≤40Mpa范围内的根据ISO 572-2的抗拉强度，以便实现良好的稳定性。

[0031] 此外，为了实现良好的稳定性，可能特别有利的是，均聚物具有在≥1000MPa至≤2200Mpa的范围内、例如在≥1300MPa至≤1900Mpa范围内、例如在≥1500MPa至≤1700Mpa的范围内的根据ISO 178的弯曲模量。

[0032] 此外，对于均聚物根据ISO 527-2的拉伸变形可能有利的是，所述拉伸变形在≥5％至≤13％的范围内，例如在≥8％MPa至≤10％的范围内。

[0033] 为了实现特别有利的可制造性，可以设定，对于注塑构件，根据ISO 306/A的维卡(Vicat)软化温度在≥130℃Mpa至≤170℃的范围内，例如在≥145℃至≤158℃的范围内。

[0034] 此外可能有利的是，除了滑石粉，固体材料还可以具有至少一种另外的固体。这种实施形式特别是可以实现，使得相对于固体材料由滑石粉组成的载体材料或板块可以明显降低载体材料的重量或由载体材料构成的板块的重量。因此，添加到固体材料中的固体特别是相对于滑石粉可以具有降低密度。例如所添加的固体可以具有在≤2000kg/m³，特别是≤1500kg/m³、例如≤1000kg/m³、特别优选500kg/m³的范围内的粗密度(Rohdichte)。根据所添加的固体，这里还可以实现针对希望的、特别是机械特性的另外的可适配性。

[0035] 所述另外的固体例如可以选自以下组，该组包括：例如木粉形式的木材、膨胀粘土、火山灰、浮岩、多孔混凝土，特别是无机的泡沫、纤维素。对于多孔混凝土，例如可以采用由Xella公司以商标名YTONG使用的固体，这种固体主要包括石英砂、石灰和混凝土，例如多孔混凝土可以具有上述组分。对于所添加的固体，例如所述固体可以由颗粒构成，所述颗粒

I4F Exhibit 1003 - 29

具有与前面针对滑石粉规定的颗粒尺寸或颗粒尺寸分布相同的颗粒尺寸或颗粒尺寸分布。所述另外的固体可以特别是以在按重量<50%、特别是按重量<20%、例如按重量<10%、进一步例如按重量<5%的范围内的比例存在。

[0036] 备选地例如对于木材、特别是对于木屑可以设定，木材的颗粒尺寸在≥0μm至≤600μm的范围内，并具有≥400μm的颗粒尺寸分布D50。

[0037] 根据另一个实施形式，载体板的材料可以具有微型空心球。这种添加材料可以特别是实现，载体板的密度以及由此制成的板块的密度可以明显降低，从而能够确保特别简单和经济的运输并且还确保能特别方便地铺设。这里，特别是通过嵌入微型空心球能够确保实现所制成的板块的稳定性，这种稳定性与没有微型空心球的材料相比不会明显降低。由此这种稳定性对于大部分应用是足够的。微型空心球这里特别是指这样的结构，所述结构具有空心的基体并且具有这样的尺寸或最大直径，所述最大直径在微米数量级。例如可以使用的空心球可以具有在≥5μm至≤100μm、例如≥20μm至≤50μm的范围内的直径。作为微型空心球的材料原则上可以考虑采用任意材料，如例如玻璃或陶瓷。此外，由于重量，塑料、例如也用于载体材料中的塑料，例如PVC、PE或PP可能是有利的，这些塑料必要时例如通过适当的添加剂可以在制造方法期间防止发生变形。

[0038] 载体板的材料的硬度可以具有在30-90N/mm^2(根据布氏法测量)的范围内的值。弹性模量可以在3000至7000N/mm^{2}的范围内。

[0039] 本发明优选设定为用于具有2mm以及更大总厚度的板块。对于总厚度低于4mm的板块优选使用主要成分为塑料的载体材料。

[0040] 互补的保持成形部适宜地设计成，使得所述保持成形部通过摆动运动能形锁合地这样连接，使得在两个相连的板块边缘的板块表面上能够形成闭合的对接缝，使得通过两个相互接触的对接面限定一个活动范围的第一区间末端，并且是对于板块相对于彼此和沿既垂直于形锁合地连接的板块边缘又平行于相连的板块的平面的运动方向的运动，这里每个保持成形部分别具有一个下止挡面，当上对接面相互接触并且对接缝闭合时，所述止挡面相互隔开的间距最大，并且下止挡面之间的所述最大间距确定活动范围的尺寸，并且当下止挡面相互接触时，所述下止挡面限定活动范围的第二区间末端。

[0041] 在一个简单的实施形式中，设有上对接面的相关的键由锁定键构成，而设有对接面的相关的槽由锁定槽构成。此外，此时一个保持成形部的下止挡面设置在锁定键的键下侧上，而互补的保持成形部的止挡面设置在锁定槽的下槽壁上。

[0042] 一个改进方案设定，在具有锁定键的保持成形部的边缘上设有倒棱，所述倒棱构造成倒角，所述倒角朝锁定键的自由端向下倾斜，并且该保持成形部的上对接面同样朝锁定键的自由端向下倾斜，上对接面的斜角小于或等于或大于倒角的斜角。

[0043] 在这个实施形式中，在设有锁定键的板块边缘上，倒角和上对接面沿相同的方向向下倾斜。但在其他实施形式中不必遵守这个原则，尤其是在一个保持成形部上附加于锁定键还具有封闭槽的实施形式中不必遵守这个原则，因为此时上对接面配设给封闭槽并且因此必须具有反向的倾斜，如下面还要说明的那样。

[0044] 当锁定键的键上侧关于板块表面倾斜并且键上侧和上对接面合并为共同的面时，则板块可以设计得特别简单，锁定槽在其上槽壁的内侧上同样相对于板块表面倾斜，并且其斜度与锁定键的上对接面的斜度相适配。

I4F Exhibit 1003 - 30

[0045] 键上侧和对接面合并为一个面。由此可以省去缺口位置或保持成形部与对接面之间的弯折点。因为省去了轮廓中的缺口位置，保持成形部具有较高的强度。此外，轮廓总体上设计得较为简单并且因此更好地适用于非常薄的板块。板块的总厚度越小，保持成形部应设计得越简单，因为板块越薄，特别是具有非常细小的细节的轮廓制造就越困难。

[0046] 此外，还由此获得另一个益处，即，锁定槽具有下槽壁，在下槽壁的自由端上设有朝板块上侧定向的保持边缘，锁定槽的下止挡面设置在下槽壁的保持边缘上，下止挡面的垂线向内指向锁定槽的槽底部。已经证实，当锁定在远离板块表面在下槽壁的区域内实现时，利用止挡面进行的锁定特别持久和稳定。

[0047] 发明人试图寻找锁定槽的下槽壁的弹性弯曲强制锁定的板块的对接面相向运动的原因，并在此发现，在下止挡面中，至少锁定槽的止挡面关于板块表面可以垂直地设置，以便避免各板块被强制相向运动。

[0048] 锁定键的键下侧适宜地具有下接触面，并且锁定槽的下槽壁设有用于锁定键的下接触面的支承面，锁定键的下接触面平行于板块表面设置，并且所述支承面同样平行于板块表面延伸。

[0049] 通过这个措施，用于下接触面的支承面在使用位置中水平设置。锁定键平坦的接触面此时可以将从上面作用的力导入下槽壁同样平坦的支承面中。此外，当板块在所存在的活动范围的范围内在其相对位置上相互移动时，接触面和支承面用作支承部和导向部。

[0050] 所述板块的一个改进方案设定，锁定键的键下侧在至少两个端部之一上具有下接触面并且具有升高的区域

[0051] 通过这个设计方案简化了拼装过程。具有锁定键的板块通常成角度(倾斜)地安放到平放的板块的锁定槽上，然后通过锁定键向下摆动的运动形锁合地嵌接到锁定槽中，当锁定键具有至少一个升高的区域时，这种板块能够较为简单地摆动装入平放的板块的锁定槽中。

[0052] 一个备选方案设定，具有锁定键的保持成形部在锁定键上方具有封闭槽，具有锁定槽的互补的保持成形部以其上槽壁的自由端构成封闭键，所述封闭键能嵌入封闭槽中。由此使得用于实现锁定强度的锁定键和锁定槽远离污物能直接进入的位置并受到保护。设置在前面的封闭键/封闭槽保持污物远离锁定键和锁定槽。

[0053] 在前面所述的备选方案中，设有封闭键的板块的上对接面可以设置在封闭键的键上侧上，并且设有封闭槽的板块的上对接面可以设置在封闭槽的上槽壁上。

附图说明

[0054] 下面在附图中举例示出本发明并根据多个实施例来详细说明本发明。其中

[0055] 图1a示出根据本发明的板块的第一实施例，其中板块分解地示出，以便示出所述板块处于锁定状态的带有闭合接缝的板块边缘，

[0056] 图1b示出根据图1a的实施例，其中示出相互接触的下止挡面和在打开最大的对接缝上的间隙，

[0057] 图2a示出根据本发明的板块的第二实施例，其中板块分解地示出，以便示出所述板块处于锁定状态的带有闭合接缝的板块边缘，

[0058] 图2b示出根据图2a的实施例，其中示出相互接触的下止挡面和在打开最大的对接

I4F Exhibit 1003 - 31

缝上的间隙，

[0059] 图3a示出板块的第三实施例，其中板块分解地示出，以便示出所述板块处于锁定状态的带有闭合接缝的板块边缘，

[0060] 图3b示出根据图3a的实施例，其中示出相互接触的下止挡面和在打开最大的对接缝上的间隙，

[0061] 图4a示出根据本发明板块的第四实施例，其中板块分解地示出，以便示出所述板块处于锁定状态的带有闭合接缝的板块边缘，

[0062] 图4b示出根据图4a的实施例，其中示出相互接触的下止挡面和在打开最大的对接缝上的间隙，

[0063] 图5a示出根据本发明的板块的第五实施例，其中板块分解地示出，以便示出所述板块处于锁定状态的带有闭合接缝的板块边缘，

[0064] 图5b示出根据图5a的实施例，其中示出相互接触的下止挡面和在打开最大的对接缝上的间隙，

[0065] 图6a示出根据本发明的板块的第六实施例，其中板块分解地示出，以便示出所述板块处于锁定状态的带有闭合接缝的板块边缘，

[0066] 图6b示出根据图6a的实施例，其中示出相互接触的下止挡面和在打开最大的对接缝上的间隙，

[0067] 图7a示出根据本发明的板块的第七实施例，其中板块分解地示出，以便示出所述板块处于锁定状态的带有闭合接缝的板块边缘，

[0068] 图7b示出根据图7a的实施例，其中示出相互接触的下止挡面和在打开最大的对接缝上的间隙，

[0069] 图7c示出根据图7a/7b的实施例，其中下止挡面相互隔开一定间距，并且在打开的对接缝上有一定的间隙，

[0070] 图8a示出根据本发明的板块的第八实施例，其中板块分解地示出，以便示出所述板块处于锁定状态的带有闭合接缝的板块边缘，

[0071] 图8b示出根据图8a的实施例，其中示出相互接触的下止挡面和在打开最大的对接缝上的间隙，

[0072] 图8c示出根据图8a/8b的实施例，其中下止挡面相互隔开一定间距，并且在打开的对接缝上有一定的间隙，

[0073] 图9a示出根据本发明的板块的第九实施例，其中板块分解地示出，以便示出所述板块处于锁定状态的带有闭合接缝的板块边缘，

[0074] 图9b示出根据图9a的实施例，其中示出相互接触的下止挡面和在打开最大的对接缝上的间隙，

[0075] 图10a示出根据本发明的板块的第十实施例，其中板块分解地示出，以便示出所述板块处于锁定状态的带有闭合接缝的板块边缘，

[0076] 图10b示出根据图10a的实施例，其中示出相互接触的下止挡面和在打开最大的对接缝上的间隙，

[0077] 图10c示出根据图10a/10b的实施例，其中下止挡面相互隔开一定间距，并且在打开的对接缝上有一定的间隙，

I4F Exhibit 1003 - 32

[0078] 图11a示出根据本发明的板块的第十一实施例，其中板块分解地示出，以便示出所述板块处于锁定状态的带有闭合接缝的板块边缘，

[0079] 图11b示出根据图11a的实施例，其中示出相互接触的下止挡面和在打开最大的对接缝上的间隙，

[0080] 图12a示出根据本发明的板块的第十二实施例，其中板块分解地示出，以便示出所述板块处于锁定状态的带有闭合接缝的板块边缘，

[0081] 图12b示出根据图12a的实施例，其中示出相互接触的下止挡面和在打开最大的对接缝上的间隙，

[0082] 图13a示出根据本发明的板块的第十三实施例，其中板块分解地示出，以便示出所述板块处于锁定状态的带有闭合接缝的板块边缘，

[0083] 图13b示出根据图13a的实施例，其中示出相互接触的下止挡面和在打开最大的对接缝上的间隙，

[0084] 图14a示出根据本发明的板块的第十四实施例，其中板块分解地示出，以便示出所述板块处于锁定状态的带有闭合接缝的板块边缘，

[0085] 图14b示出根据图14a的实施例，其中示出相互接触的下止挡面和在打开最大的对接缝上的间隙，

[0086] 图15a示出根据本发明的板块的第十五实施例，其中板块分解地示出，以便示出所述板块处于锁定状态的带有闭合接缝的板块边缘，

[0087] 图15b示出根据图15a的实施例，其中示出相互接触的下止挡面和在打开最大的对接缝上的间隙。

具体实施方式

[0088] 图1a示出根据本发明的板块的第一实施例。所述板块分解地示出，在其相对置的板块边缘1和1’上在锁定状态下可以形成闭合的对接缝。当然，局部示出的板块边缘也可以理解为两个没有完全分开的板块的局部视图。

[0089] 在实践中常见的是，当例如在板块排末端的板块过长，将这个板块分开，以便将其截短到必要的长度。通常可以利用被分离下来的剩余段开始一个新的板块排。被分开的板块的互补的保持成形部相互配合插接并且原则上可以相互锁定，如在现有的组图1-15中示出的那样。

[0090] 图1的一组附图的板块1或1’基于Välinge Innovation AB公司的经典结构，如由WO 1994/026999已知的那样。它所示出的相对的板块边缘上具有互补的锁定机构2和2’。这种锁定机构设计成具有锁定槽4或互补的锁定键5的形锁合的保持成形部3或3’。锁定槽包括上槽壁4a和下槽壁4b。具有锁定槽4的保持成形部构造成两部分的。这两个组成部分之一是板块板件6。在板块板件的边缘上形锁合地固定由另一种材料组成的单独的条带7作为第二组成部分。单独的条带7构成锁定槽4的下槽壁4b。

[0091] 相对于经典的板块，所述板块这样改进，使得板块表面5或5’在两个保持成形部3和3’的边缘上分别具有倒棱K_1或K_2。在倒棱的下方分别设有一个上对接面，就是说在具有锁定槽的保持成形部3上设有上对接面8，而且在具有锁定键5的保持成形部5’上也设有上对接面9。在图1a所示的位置中，板块边缘1/1’相互对接，使得两个上对接面8和9接触并形成

I4F Exhibit 1003 - 33

闭合对接缝T。对接缝T相对于板块表面S或S'倾斜。上对接面9配设给锁定键5，而该上对接面9朝锁定键5的自由端的方向向下倾斜。互补的上对接面8配设给锁定槽4，并且该对接面8朝锁定槽4的槽底部的方向向下倾斜。互补的保持成型部3和3'设计成使得所述保持成形部通过带有锁定键5的板块1'的摆动运动M倾斜地安放到平放的板块1的锁定槽4上并可以形锁合地相互锁定。为此，通常倾斜地安装板块，如在图1a中用点划线示出的那样，相同的情况也适用于下面的图2至15，在这些图中，同样用点划线示出倾斜地安装的板块边缘。通过这种利用摆动运动M实现的锁定，能够分别产生两个板块边缘1和1'所示出的闭合的对接缝T。通过相互接触的两个对接面8和9限定了活动范围X的第一区间末端，并且是针对板块边缘相对于彼此并且沿既垂直于形锁合地连接的板块边缘并且还平行于相互连接的板块的平面的运动方向的运动，如用双箭头C示出的那样。

[0092] 此外，每个保持成形部3或3'分别具有下止挡面。设有锁定槽4的板块1的下止挡面10位于锁定槽4的下槽壁4b上。为此目的，下槽壁4b在其自由端上设有保持边缘11，所述保持边缘指向板块表面S'。保持边缘11具有指向锁定槽4的槽底部的自由侧面，在所述自由侧面上构成下止挡面10。

[0093] 在图1a/1b的实施例中，下止挡面10相对于板块表面的垂线以一定角度α的斜度倾斜。设有锁定键5的板块1'的下止挡面12位于键下侧13上。所述键下侧具有侧凹14并由此构成背面的朝板块芯部定向的侧面，在该侧面上构成下止挡面12。锁定键5的这个下止挡面12以与锁定槽4的下止挡面10相同的角度α相对于板块表面S/S'倾斜。

[0094] 锁定槽4的下止挡面10的倾斜位置形成倾斜的平面，而下槽壁4b具有一定的弹性。当下槽壁4b弹性地向下弯曲时，在下槽壁4b中形成弹簧弹性的复位力。当所述复位力向锁定键5的下止挡面12上推压时，则由此板块边缘1和1'能够相向运动，从而上对接面8和9之间存在的间隙B变窄。优选仅通过复位力能实现的板块边缘相对于彼此的位移不如使上对接面8和9能相互接触的位移那样大。

[0095] 如果上对接面8和9相互接触并且对接缝T闭合，则下止挡面10和12相互隔开最大的间距。下止挡面10和12之间的在图1a中示出的这个水平间距A确定用于处于锁定状态的板块1或1'的活动范围X的尺寸(A＝X)。如果下止挡面10和12之间的所述间距A理解为一个直角三角形的斜边，则间隙的尺寸B(间隙宽度)相当于该直角三角形的一个直角边。

[0096] 在图1b中，两个板块边缘1和1'相对于彼此移动。下止挡面10和12相互接触并且上对接面8和9形成间隙A。下止挡面10和12在它们相互接触的位置中限定用于锁定的板块边缘1/1'的活动范围X的第二区间末端。

[0097] 在锁定键5的键上侧15上设有一个部段15a，该部段平行于板块表面S'(水平地)延伸。该部段15a与锁定槽4一起基本上实现了锁定沿竖直方向的强度，并且还将板块表面S和S'保持在一个平面中并防止板块表面S和S'之间出现不希望的高度偏差。

[0098] 在该部段15a的上方设置上对接面9并且在对接面9的上方存在倒角16形式的倒棱K_2。倒角16的斜度和上对接面9的斜度是相同的。倒棱K_1同样设计成倒角17。两个倒角16和17构成对称的V形接缝18。两个板块表面S和S'在这个实施例中处于共同的平面中。就是说在板块边缘上或在板块表面S/S'之间没有形成高度偏差。当然替代倒角16和17也可以设想倒棱的其他设计方案，如圆角或台阶，当然，形成共同的接缝的倒棱也可以相互不对称地设置或具有不同的几何形状，例如倒角形式的倒棱可以与圆角形式的倒棱相组合。

I4F Exhibit 1003 - 34

[0099] 键下侧13具有平的下接触面13a，所述接触面平行于板块表面S’设置。锁定槽4的下槽壁4b具有内侧19，所述内侧设有同样平行于板块表面S设置的、用于锁定键5的下接触面13a的平的支承面19a。从上面作用到板块表面S/S’上的力可以通过锁定键5平的接触面13a导入下槽壁4b的支承面19a中。此外，接触面13a和支承面19a用作用于板块边缘的支承部和导向部，所述板块边缘能够在现有的活动范围X的区域内处于运动并且能够改变其相对于彼此的位置。

[0100] 一个基于图1a/1b的实施例的备选方案在图2a和2b中示出。这里参考图1a/1b。对于相同的特征采用相同的附图标记。该备选方案与前面的实施例的区别在于，两个下止挡面10或12不同地设置。位于锁定槽4的下槽壁4b的保持边缘11上的下止挡面10平行于板块表面的垂线延伸。不使用相对于垂线的倾斜结构，从而在这个实施例中避免了倾斜平面的效应。锁定槽4的下槽壁在该实施例中也是弹簧弹性的并且可以向下弯曲。弹簧弹性的复位力此时可以使下槽壁4b重新朝其中性位置的方向复位。但由于下止挡面10没有构成倾斜的平面，这种复位运动没有转向成带有锁定键5的板块边缘1’的水平运动，并且板块边缘1和1’不会相向运动。

[0101] 图3a和3b中示出第三实施例。该实施例与前面的实施例在倒棱K_1和K_2的设计上是相同的，并且在锁定键5的键上侧15上也设有部段15a，该部段在所示的使用位置中水平延伸，就是说平行于板块表面S’延伸。这个部段15a连同锁定槽4一起基本上实现了锁定沿竖直方向的强度并且此外还将板块表面S和S’保持在一个共同的平面中，并防止板块表面S和S’之间出现不希望的高度偏差。在其键下侧13上，锁定键5设有接触面13a，所述接触面以一定曲率向外拱曲，而锁定槽4的下槽壁4b在其内侧19上具有支承面19a并在其自由端上具有保持边缘11，支承面19a具有向内定向的弯曲，所述弯曲朝保持边缘11升高并在这里形成下止挡面10。支承面19a弯曲的轮廓与键下侧13的接触面13a相比具有较宽的(开度更大的)结构，从而由此形成用于板块边缘1和1’的活动范围X。从上面作用到板块1或1’上的力可以通过锁定键5的弯曲的接触面13a导入下槽壁4b的弯曲的支承面19a中。下止挡面10和12分别是键下侧13a的弯曲部或下槽壁4b内侧的弯曲部的一部分。在图3b中，板块边缘1和1’相互运动分开。下止挡面10和12相互接触并在上对接面8和9之间形成间隙B。在这个实施例中，由于下槽壁的弯曲，下槽壁4b可以弹性地向下弯曲并形成复位力，所述复位力使板块边缘1和1’重新相向运动。如果下槽壁4b再次达到其中性位置，则在这个实施例中在上对接面8和9之间仍保留存在残余间隙。

[0102] 图4a和4b示出另一个具有锁定键5和互补的锁定槽4的实施例，其中锁定键5在其键上侧15上具有部段15a，该部段在所示的使用位置中水平延伸，或者说平行于板块表面S/S’延伸。这个部段与互补的锁定槽4一起基本上实现了锁定沿竖直方向的强度。此外该部段还还将板块表面S和S’保持在一个共同的平面中并防止板块表面S和S’之间出现不希望的高度偏差。设有上对接面8和9，但所述对接面设置在与前面的实施例不同的位置处。具有锁定槽4的板块边缘1的上对接面8位于锁定槽4的上槽壁4a的自由端的外侧上，它与倒角17对齐或处于一个平面中。上槽壁4a的自由端类似于键起作用并且配合到为此设置的槽中，所述槽在互补的保持成形部3’的锁定键5的上方设置在互补的保持成形部上。这个附加的键在本发明的范围称为封闭键20，而所述附加的槽称为封闭槽21，因为通过它们的对接面8和9能够形成闭合的对接缝T。因此，在这个设计方案中，每个保持成形部3或3’都分别具有一

I4F Exhibit 1003 - 35

个槽和一个键，就是说，在锁定状态下有两个槽、即锁定槽4和封闭槽21，以及有两个键、即锁定键5和封闭键20参与到板块边缘1和1'的锁定中。

[0103] 图4a和4b的实施例还设定，锁定键5的键下侧13具有平的接触面13a，该接触面平行于板块表面S'设置。锁定槽4的下槽壁4b在这个实施例中与板块的芯部一体地构成，并且下槽壁4b同样具有平行于板块表面S的设置的、用于锁定键5的下接触面13a的平的支承面19a。从上面作用到板块1/1'上的力可以通过锁定键5的平的接触面13a导出到下槽壁4b的支承面19a中。此外，接触面13a和支承面19a还用于对板块边缘1和1'进行支承和导向，所述板块边缘可以在所存在的活动范围X的区域内处于运动中并改变其相对于彼此的相对位置。活动范围X在一侧由位于封闭键20或封闭槽21上的上对接面8和9限定，而另一个区间末端由下止挡面10和12限定，所述下止挡面位于锁定键5或锁定槽4上。倒棱K_1和K_2也设计成倒角16或17并共同构成对称的V形接缝18。

[0104] 图5a和5b示出一个实施例，其中，反作用于板块边缘1和1'的相互离开运动的下止挡面10和12设置在不同于前面的实施例的位置处，并且是设置在锁定槽4的上槽壁4a的内侧22或设置在锁定键5的键上侧15上。下槽壁4b设计得比锁定槽4的上槽壁4a短。

[0105] 图6a和6b示出另一个实施例。这是这样的另一个实施例，其中，每个保持成形部3和3'分别都具有一个槽和一个键，如在根据图4a/4b的实施例中那样，这里参考这个实施例。就是说，一个保持成形部3具有锁定槽4并同时具有封闭键20，而互补的保持成形部3'具有锁定键5并同时具有封闭槽21。

[0106] 锁定键5的键下侧15具有带有弯折部23的轮廓。键下侧12的位于弯折部23之前的并指向锁定键5的顶端的前部区域24具有弯曲的接触面24a，该接触面朝键顶端升高。锁定槽4与此匹配地具有带有两个区域的支承面25，其中一个区域25a朝向槽底部并朝槽底部升高。支承面25的这个升高区域25a在锁定状态下与键下侧13的前部区域24的弯曲接触面24a共同作用。在键下侧13的后部区域26构成向外拱曲的突起27，该突起伸入支承面25中的凹部28中并支承在支承面25上。在键下侧13的弯曲的前部接触面24a和拱曲的突起27与凹部28接触的位置之间存在一个空腔29，磨屑颗粒和/或污物颗粒可以容纳在所述空腔中。

[0107] 锁定键5的下止挡面12位于突起27背面的表面上。与其匹配地在下槽壁4b的自由端上设有保持边缘11，所述保持边缘指向板块表面S'。保持边缘11具有朝锁定槽4的槽底部指向的自由侧面，锁定槽4的下止挡面10位于所述自由侧面上，该下止挡面与锁定键的下止挡面12配合作用。锁定槽4的下止挡面10相对于板块表面的垂线倾斜一定角度α地设置。在图6a中，下止挡面10和12相互间具有水平的间距，并且上对接面8和9相互接触，如根据图4a的实施例中那样。

[0108] 图7a、7b和7c示出具有特别简单的板块边缘1和1'的结构的板块。所述板块在相对置的板块边缘上具有锁定键5和锁定槽4以及倒棱K_1和K_2。设有上对接面8和9以及下止挡面10和12。在锁定状态下，存在活动范围X，由此板块边缘能够相对于彼此运动并且是沿垂直于形锁合地连接的板块边缘以及平行于连接的板块的平面的方向运动。倒棱K_1和K_2分别设计成倒角16和17。在具有锁定键5的板块边缘1的倒角16上连接上对接面9。这个对接面9与倒角16位于共同的平面中。在该实施例，这实现了一个特别之处，即，上对接面9是锁定键5的键上侧15的一体的组成部分。此外，锁定槽4具有上槽壁4a，其内侧22与键上侧15的斜角相匹配。上槽壁4a的内侧22由此作为锁定槽4的内侧22的一体的组成部分构成上对接面8。

I4F Exhibit 1003 - 36

锁定沿竖直方向的强度基本上由倾斜的键上侧15与锁定槽4的同样倾斜的上部内侧22实现。此外，由于一体的结构形式，通过倾斜的键上侧15和锁定槽4的内侧22也能够形成闭合的对接缝T。此外还确保了，板块表面S和S'位于一个平面内，并且以这种方式防止在板块表面S和S'之间出现不希望的高度偏差。

[0109] 设有锁定槽4的板块的下止挡面10位于锁定槽4的下槽壁4b上。为此目的，下槽壁4b在其自由端上设有保持边缘11，所述保持边缘向上指向板块表面5。保持边缘11具有指向锁定槽4的槽底部的自由侧面，在所述自由侧面上，下止挡面10沿垂直于板块平面S的方向延伸。设有锁定键5的板块的下止挡面12位于键下侧13上。键下侧具有侧凹14并由此形成背面的指向板块的芯部的侧面，下止挡面12在该侧面上构成。锁定键5的这个下止挡面12垂直于板块表面S'延伸。

[0110] 在图7a中，上对接面8和9相互接触并且形成闭合的对接缝T。下止挡面10和12在板块边缘所示的位置中相互具有水平的间距，所述间距对应于活动范围X。

[0111] 在图7c中示出板块边缘1和1'的一个位置，在该位置中，上对接面8和9不接触，下止挡面10和12也没有相互接触。板块边缘相互锁定并能够在活动范围X的内部相对于彼此运动，直至达到活动范围的通过上对接面8和9的接触限定的区间末端，或者板块边缘能够分别沿相反的方向运动，直至达到活动范围的通过下止挡面10和12限定的区间末端。在已铺设的状态下，如果将多个板块拼接成地面覆层，则在两个锁定的板块边缘之间通常建立一个相对的中间位置，如图7c中示出的那样，在这个中间位置中，存在一定程度上较大的上部间隙，以及在板块边缘的下止挡面10和12之间形成一定程度上较大的空缺。在日常使用中，板块边缘可能相对于彼此运动并且上部的间隙和下止挡面之间的空缺的尺寸可能发生变化。当然，如根据图7c、8c和10c举例示出的那样，在所有其他实施例中也可能存在板块边缘相对于彼此的中间位置，但为了简单起见，对于这些实施例没有采用附加的视图。此外，根据图7a，锁定槽4的下槽壁4b的内侧19具有水平的支承面19a，它平行于板块上侧S延伸并具有朝槽底部升高的前部区域19b。

[0112] 锁定键5在其键下侧13上具有水平的接触面13a，所述接触面平行于板块上侧S'延伸。此外，在键下侧13上设有突出的前部区域13b，所述前部区域朝锁定键5的顶端升高。在锁定状态下，在下槽壁的内侧19的升高的区域19b中和键下侧13的升高的区域13b之间不发生接触。只有支承面19a和接触面13a的水平的区域相互贴靠。

[0113] 因此，在前面和后面的实施例中，板块边缘或板块的下侧上存在的倒棱优选用于保护边缘，以免发生损坏。

[0114] 图8a和8b的实施例基于前一个实施例，这里参考该实施例。与该实施例相比，锁定槽4的设计方案有所变化。前面一个实施例在下槽壁4b的内侧上具有一直升高到锁定槽4的槽底部的区域19b。与此不同，在当前的实施例中，省去了内侧19上的上升的区域。内侧19根据图8a基本上平行于板块表面地(水平地)一直延伸到锁定槽的槽底部。锁定键5的键下侧13保持与图7a中的键下侧相同，就是说，朝锁定键5的键顶端，在键下侧13上设有升高的区域13b。通过这种改变，在键下侧的升高的区域13b与带有支承面19a的水平内侧19之间形成比图7a的实施例中大的自由空间。

[0115] 在图8c中，和在图7c中一样，示出板块边缘1和1'的一个位置，在该位置中，上对接面8和9不相互接触，下止挡面10和12相互也不发生接触。板块边缘相互锁定并且可以在活

I4F Exhibit 1003 - 37

动范围X的内部相对于彼此运动，直至达到活动范围的通过上对接面8和9的接触限定的区间末端，或者可以分别沿相反的方向运动，直至到达活动范围的通过下止挡面10和12限定的区间末端。

[0116] 图9a和9b示出板块的第三实施例，该板块的互补的保持成形部3和3'都分别具有一个槽和一个键，和在根据图4a/4b以及6a/6b的实施例中一样，这里参考这些实施例。就是说，一个保持成形部3具有锁定槽4并同时具有封闭键20，而互补的保持成形部3'具有锁定键5并同时具有封闭槽21。

[0117] 根据图9a的板块与根据图4a的板块的区别主要在于锁定槽4的不同设计结构。就是说，根据图9a，锁定槽4具有带有内侧19的下槽壁4b，所述内侧具有明显的上升的区域19b。所述上升的区域19b沿锁定槽4的槽底部的方向向上升高。此外，内侧19还具有支承面19a，所述支承面平行于板块表面S(水平地)延伸。上升的区域19b大致终止于锁定槽4的上槽壁4a的下方。键下侧13具有接触面13a，所述接触面平行于板块表面延伸并且具有前部区域13b，所述前部区域朝锁定键5的键顶端升高。

[0118] 和图4a中的止挡面相同，下止挡面10和12相对于板块表面S/S'的垂线倾斜设置。

[0119] 设有上对接面，并且具有锁定槽4的板块边缘的上对接面8设置在锁定槽4的上槽壁4a的自由端的外侧上。上槽壁4a的这个自由端如同键一样作用并且配合到为此设置的槽中，所述槽在互补的保持成形部3'上设置在其锁定键5的上方。在所述槽中，在上槽壁上设置互补的对接面9。该附加的键在本发明的范围内也称为封闭键20，而所述附加的槽称为封闭槽21，因为它们带有在理想情况下使对接缝T闭合的对接面8he9。

[0120] 图10a和10b示出一个实施例，该实施例基于图7a/7b的实施例，这里参考该实施例。与该实施例不同的主要是锁定槽4的下槽壁4b的内侧19发生了改变。下槽壁4b的内侧19主要具有两个区域。第一区域形成平行于板块表面S延伸的支承面19a。所述支承面19a一直延伸到下止挡面10，所述下止挡面设置在下槽壁4b的保持边缘11上。支承面19a从这里沿锁定槽4的槽底部的方向延伸，但所述支承面没有延伸到槽底部上。在支承面19的端部与槽底部之间设有凹口19c，所述空缺比支承面19a更深。锁定键5的键下侧13也主要具有两个区域。第一区域形成平行于板块上侧延伸的接触面13a，所述接触面与锁定槽4的下槽壁4b的支承面19a配合作用。键下侧13的第二区域13b朝向锁定键5的顶端。所述第二区域具有凸肩13c，该凸肩与接触面13a邻接并连接在弯曲升的区域13b上，所述区域朝锁定键5的顶端升高。凸肩13c相对于接触面13a回缩，就是说，所述凸肩到板块表面S'的距离小于接触面13a的距离。在锁定状态下，通过凸肩13c在键下侧13上以及通过凹口19c在下槽壁4b中形成加大的自由空间30，通过该自由空间30，具有锁定键5的板块1可以倾斜地安放，而不必使保持成形部3和/或3'发生弹性变形，如通过图10a中的点划线示出的那样。锁定键5或其升高的前部区域13b的顶端在板块1'的倾斜位置中可以下降到下槽壁4b的凹口19c的底部上，如通过作为点划线示出的倾斜设置的板块边缘示出的那样。

[0121] 下止挡面10和12根据图10a和10b也沿垂直于板块平面的方向延伸，和图7a/7b中一样。

[0122] 在图10c中示出板块边缘1和1'的一个位置，其中上对接面8和9不相互接触，下止挡面10和12也没有相互接触。板块边缘相互锁定并且可以在活动范围X的内部相对于彼此运动，直至达到活动范围的通过上对接面8和9的接触限定的区间末端，或者板块边缘能够

I4F Exhibit 1003 - 38

分别沿相反的方向运动，直至达到活动范围的通过下止挡面10和12限定的区间末端。

[0123] 图11a和11b示出一个实施例，所述实施例基于图9a/9b的实施例，这里参考该实施例。如在该实施例中那样，互补的保持成形部3和3’分别都具有一个槽和一个键。就是说，一个保持成形部3具有锁定槽4并同时具有封闭键20，而互补的保持成形部3’具有锁定键5并同时具有封闭槽21。

[0124] 相对于根据组图9，锁定键5的键上侧15不再平行于板块表面S’，相反键上侧根据图11a相对于板块表面S’以平缓的角度倾斜。相同的情况也适用于锁定槽4的上槽壁4a的内侧22，其斜角在锁定状态下对应于键上侧15的斜角。

[0125] 此外，锁定槽4的上槽壁4a形成封闭键20，所述封闭键在该实施例中具有键顶端20a和两个侧面，其中上侧面同时构成上对接面8。与上槽壁4a的内侧的其余部分相比，下侧面20b相对于板块表面S更大地倾斜，所述其余部分的斜角对应于键上侧15的斜角。当两个板块边缘1和1’拼接时，在下侧面20b和槽底部之间形成一个自由空间，这里槽底部设计成U形倒圆的。

[0126] 如果如图11b中所示，两个锁定的板块边缘1和1’占据这样的位置，在该位置中，在上对接面8和9之间形成间隙，此时还在平缓倾斜的键上侧15和锁定槽的上槽壁4a的内侧22之间形成最小的间隙。

[0127] 组图12至15示出不同实施例，这些实施例具有相同的基本构思并且只是在板块表面S或S’上的倒棱K_1和K_2的区域中的设计结构上以及上对接面8和9的设计结构上有所区别。

[0128] 所述基本构思分别设有具有锁定槽4的保持成形部3以及互补的保持成形部3’，所述互补的保持成形部在相对的板块边缘1’上设有锁定键5。锁定槽4和锁定键5始终形锁合地锁定板块边缘1和1’，并且一方面沿垂直于板块平面的方向锁定，另一方面沿垂直于锁定的板块边缘1/1’并同时平行于板块平面的方向(水平)锁定。

[0129] 锁定槽4具有上槽壁4a和下槽壁4b，所述下槽壁比上槽壁长。下槽壁4b在其自由端上携带保持边缘11，所述保持边缘向上朝板块表面S的方向延伸。

[0130] 为了水平地锁定而设有下止挡面，就是说锁定槽4的下槽壁4b的保持边缘11上的下止挡面10和锁定键5的键下侧13上的下止挡面12。为此目的，在键下侧13上设有侧凹14，所述侧凹具有背面的指向板块的芯部的侧面，锁定键5的下止挡面12位于所述侧面上。

[0131] 锁定键5的下止挡面13以及锁定槽4的下止挡面10在组图12至15的实施例中都分别垂直于板块表面S或S’。

[0132] 在组图12至15中，键下侧13始终具有平的接触面13a，所述接触面平行于板块表面S’延伸，并且下槽壁4b具有带有支承面19a的内侧19，所述支承面同样平行于板块表面S’延伸。在所述接触面13a的两个端部上分别连接键下侧13的升高的区域。升高的前部区域13b朝锁定键5的自由端升高。后部区域13d一直升高到锁定键5的下止挡面12。后部区域13d可以在曲线上在锁定槽4的下槽壁4b的保持边缘11旁边运动(摆动)经过，而不会向保持边11施加压力。以这种方式，板块边缘1和1’可以非常简单地并且无需使保持成形部3和3’变形地拼装或相互分离。为此目的，使带有锁定键5的板块向上摆动就足够了，并且是绕V形接缝的顶点处的交点Z摆动。在理想情况下，因此，键下侧的升高的后部区域13d的轮廓在一个圆弧R上，该圆弧的中点是V形接缝的交点Z。

[0133] 但如果希望保持成形部有一定程度的弹性变形，则可以在键下侧13的后部区域

I4F Exhibit 1003 - 39

13d上简单地留下略多的材料，从而升高的后部区域13d的轮廓此时位于较大的圆弧上。此时，为了将锁定键5嵌接到锁定槽4中，必须在一定程度上向下槽壁4b的保持边缘11上施加力，由此保持边缘至少暂时地弹性向下弯曲并接着重新完全或部分地朝其中性位置的方向复位。

[0134] 键下侧13的升高的前部区域13b有利于通过摆动运动M将锁定键5嵌接到锁定槽4中或使锁定键摆动离开锁定槽，而不必以键下侧13向下槽壁4b施加很大的压力。

[0135] 在图12b中以及后面的组图中用“b”表示的图示中，分别示出板块的一个位置，在该位置中，下止挡面10和12发生接触。

[0136] 此外，设有上对接面8和9，当板块边缘1和1’相向运动直到在下止挡面10和12之间形成最大间距时，所述对接面相互接触，如图12a所示的那样。上对接面8和9此时形成闭合的对接缝T，并且对接面8和9的接触限定用于锁定的板块边缘1和1’的活动范围X的区间末端。活动范围的另一个区间末端通过下止挡面10和12的接触来限定，如图12b中示出的那样。

[0137] 键下侧13的接触面13a和锁定槽4的下槽壁4a的支承面19a用作用于板块边缘1和1’在活动范围X内部的相对运动的支承和导向面。

[0138] 如上所述，组图12至15的实施例的区别仅在于倒棱和上对接面的设计结构。

[0139] 根据组图12至15，倒棱分别构造成倒角。在锁定状态下，倒角16或17形成V形接缝18。在V形接缝18的下方分别设有上对接面8和9，所述对接面相互平行地设置并可以相互接触，如图12a、13a、14a和15a中示出的那样。

[0140] 在图12a中，具有锁定键5的板块边缘1的倒角16相对于板块表面S’倾斜一个约60°的角度β，而该板块边缘的上对接面9相对于板块表面S’倾斜一个约45°的较小的角度γ。由于不同的斜度，在倒角16和上对接面9之间存在略微的弯折部31。在具有锁定槽4的互补的保持成形部3上，上对接面8这样倾斜，使得该对接面在两个板块边缘的锁定状态下平行于相对置的上对接面9延伸。上对接面9以这样的斜度一直延伸到上槽壁4a的内侧22上，该内侧平行于板块表面S。

[0141] 此外，图12a示出处于这样的位置中的板块边缘1和1’，在该位置中，板块边缘相互对接，从而上对接面8和9相接触。同时，下止挡面10和12在该位置中相互具有最大的间距A。在图12b中，板块边缘1和1’这样运动相互离开，使得在上对接面8和9之间形成最大的间隙B。由此同时下止挡面10和12相互发生接触。可以看到，在下止挡面之间可能的最大间距A始终大于上对接面8和9之间的间隙B的最大宽度。由于上对接面8和9的倾斜布置，可以进入位于其上的V形接缝中的污物由于间隙B较为狭窄而难以进入该间隙。此外，上对接面8和9的倾斜布置还防止了，能够向下向间隙B中深入观察。观察者只能看到两个上对接面之一9的一小部分，因为另一个对接面8对于观察者而言始终是被遮蔽的。但在对接面9的可见的部分上，观察深度保持较小。

[0142] 在根据图13a和13b的实施例中，具有锁定键5的倒角16具有与图12a中相同的斜角β。但上对接面8和9以角度γ相对于板块表面S/S’倾斜，但该角度还略小于图12a中的角度γ。由此间隙B的宽度小于前面的实施例中的间隙。在上对接面8和9和上槽壁4a的内侧22的平行于板块表面S的区域之间，一个较短的部段垂直于板块表面S延伸，从而形成一个小的凸肩32。如果凸肩32不存在，并且上对接面8以保持相同的斜度一直延伸到上槽壁4a的内侧

I4F Exhibit 1003 - 40

22，则在水平的键上侧15a和上槽壁4a的水平区域之间的面接触明显变小。因此，凸肩32用于提高所述位置处的水平面接触并以这种方式改进锁定的强度。

[0143] 在图13a中示出的下止挡面10和12之间的间距A与图12a相同。但在图13b中示出间隙B比图12b中要窄，因为上对接面8和9相对于板块表面S以比图12b中小的斜角设置。

[0144] 图14a和14b示出一个实施例，其中，具有锁定键5的板块边缘1的倒角16也具有和图12a中相同的斜角β。但上对接面8和9以与倒角16的斜角β相同的角度γ相对于板块表面S/S'倾斜。就是说，对于具有锁定键5的板块边缘，倒角16和上对接面9设置在相同的平面中。因此，对于该板块边缘1'，在倒角16和对接面9之间没有弯折部。

[0145] 具有锁定槽4的板块边缘的上槽壁4a上的互补的上对接面8以保持相同的斜度一直延伸到上槽壁4a的水平的内侧22上。

[0146] 在图14a中示出的下止挡面10和12之间的间距A与图12a相同。但在图14b中示出的间隙B具有比图12b中大的宽度，因为上对接面8和9以大于图12b中的斜角相对于板块表面S设置。

[0147] 图15a和15b的实施例与前面的实施例14a/14b的区别仅在于倒角16和17的角度不同。所述倒角相对于板块表面S/S'以较小的角度β倾斜，该角度这里约为45°。对于具有锁定键5的板块边缘，倒角16和上对接面9也设置在一个相同的平面中。就是说，这个板块边缘1'的上对接面9以与倒角16的斜角β相同的角度γ相对于板块表面S'倾斜。

[0148] 在图15a中示出的下止挡面10和12之间的间距A也与图12a相同。在图15b中示出的间隙B具有和图12b中的间隙B相同的宽度，因为上对接面8和9的斜角γ是相同的。

[0149] 间隙的宽度B因此在图13b中的较窄的间隙宽度和根据图14b的较大的间隙宽度B之间。

[0150] 附图标记列表

[0151] 1 板块边缘

[0152] 1' 板块边缘

[0153] 2 锁定机构

[0154] 2' 锁定机构

[0155] 3 保持成形部

[0156] 3' 保持成形部

[0157] 4 锁定槽

[0158] 4a 上槽壁

[0159] 4b 下槽壁

[0160] 5 锁定键

[0161] 6 板块板件

[0162] 7 单独的板条

[0163] 8 上对接面(锁定槽)

[0164] 9 上对接面(锁定键)

[0165] 10 下止挡面(锁定槽)

[0166] 11 保持边缘

[0167] 12 下止挡面(锁定键)

I4F Exhibit 1003 - 41

[0168]	13	键下侧
[0169]	13a	接触面
[0170]	13b	升高的前部区域
[0171]	13c	凸肩
[0172]	13d	升高的后部区域
[0173]	14	侧凹
[0174]	15	键上侧
[0175]	15a	水平的部段
[0176]	16	倒角
[0177]	17	倒角
[0178]	18	V形接缝
[0179]	19	内侧(下槽壁)
[0180]	19a	支承面(下槽壁)
[0181]	19b	上升的区域
[0182]	19c	缺口
[0183]	20	封闭键
[0184]	20a	键顶端
[0185]	20b	下侧面
[0186]	21	封闭槽
[0187]	22	内侧(上槽壁)
[0188]	23	弯折部
[0189]	24	前部区域(键下侧)
[0190]	24a	弯曲的接触面
[0191]	25	支承面(锁定槽)
[0192]	25a	上升区域
[0193]	26	后部区域(键下侧)
[0194]	27	拱曲的突起
[0195]	28	凹部(支承面)
[0196]	29	空腔
[0197]	30	自由空间
[0198]	31	凸肩
[0199]	C	双箭头
[0200]	K_1	倒棱
[0201]	K_2	倒棱
[0202]	M	摆动运动
[0203]	R	倒圆
[0204]	S	板块表面
[0205]	S’	板块表面
[0206]	T	对接缝

I4F Exhibit 1003 - 42

[0207] Z 交点

[0208] α 角度

[0209] β 角度

[0210] γ 角度

I4F Exhibit 1003 - 43

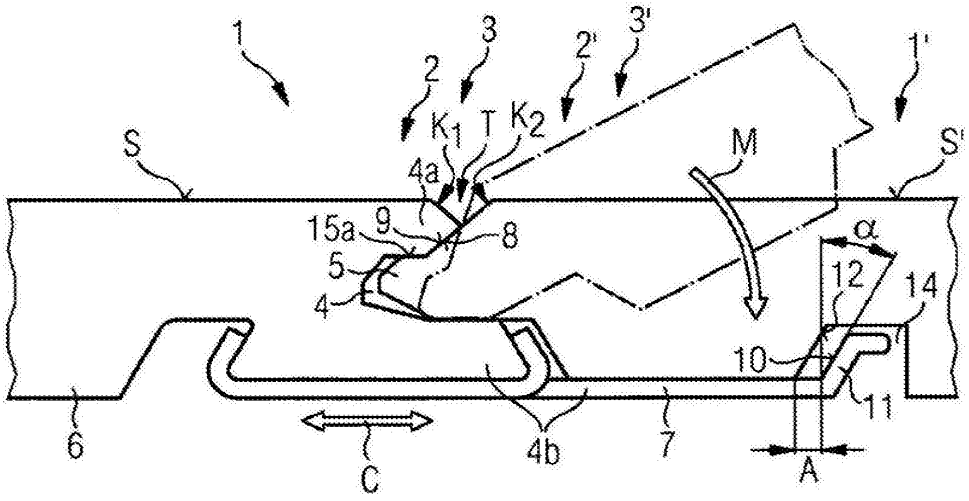


图1a

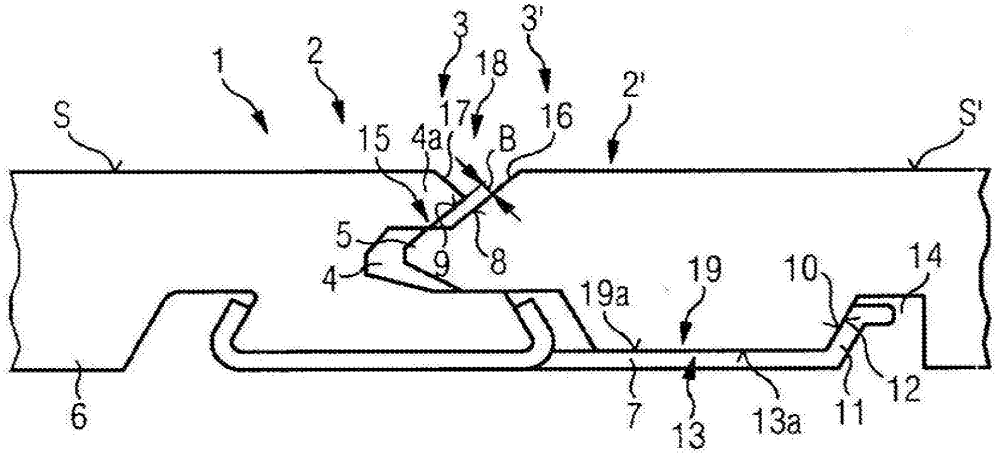


图1b

I4F Exhibit 1003 - 44

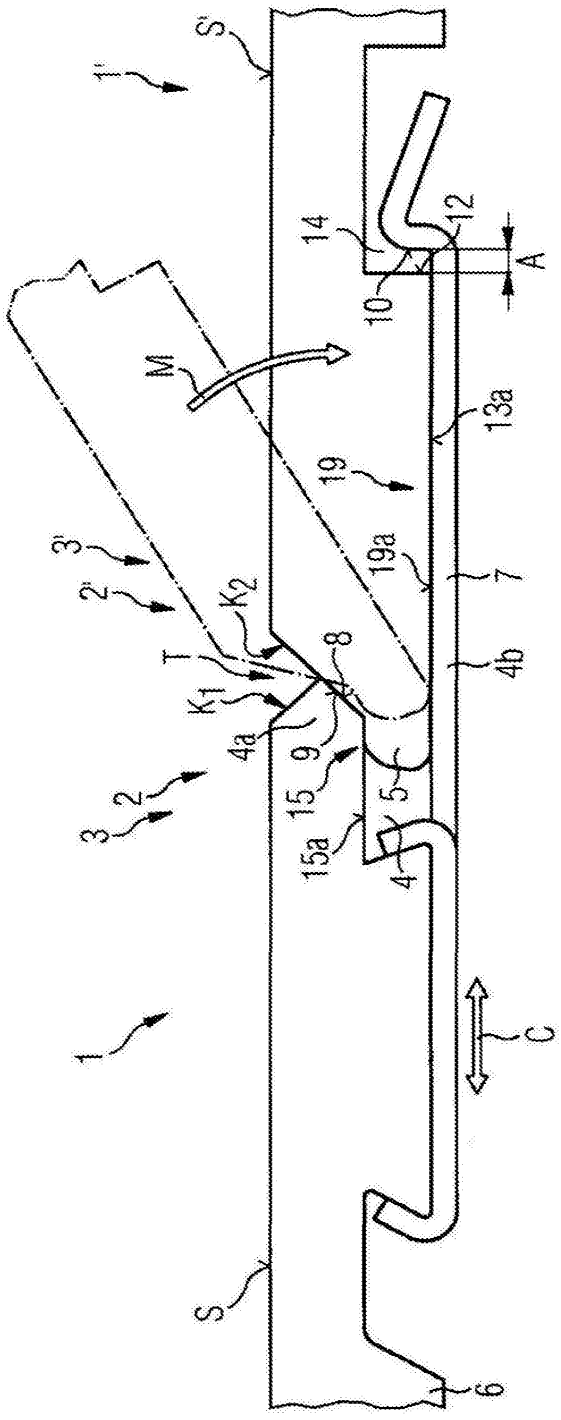


图2a

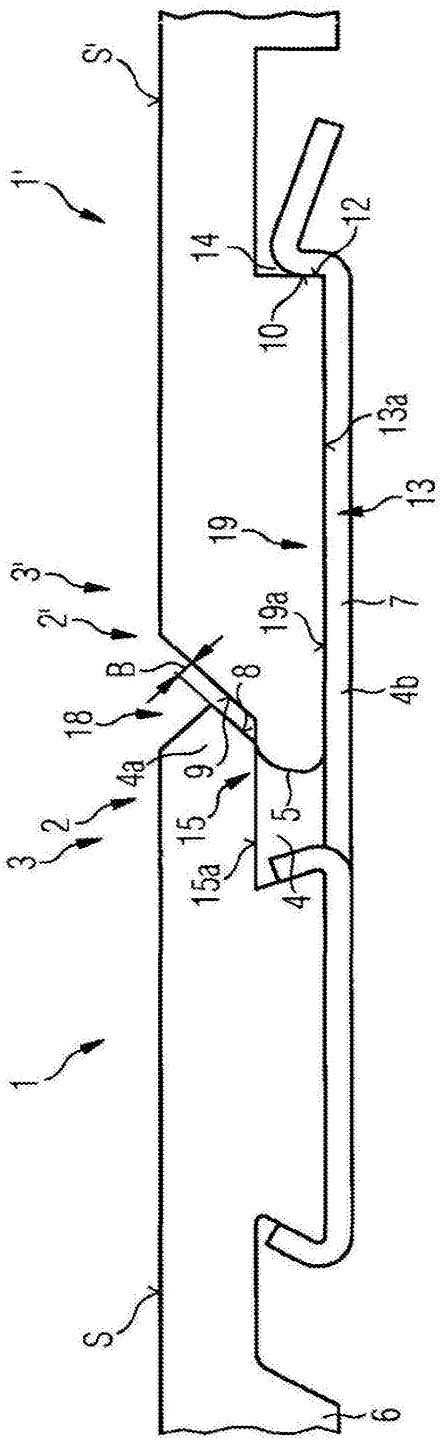


图2b

I4F Exhibit 1003 - 45

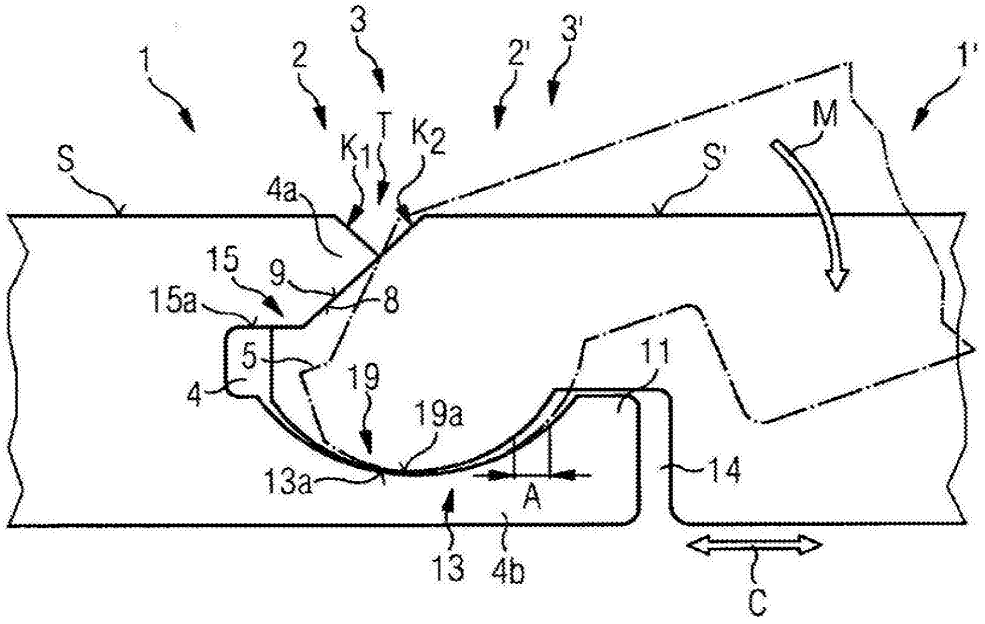


图3a

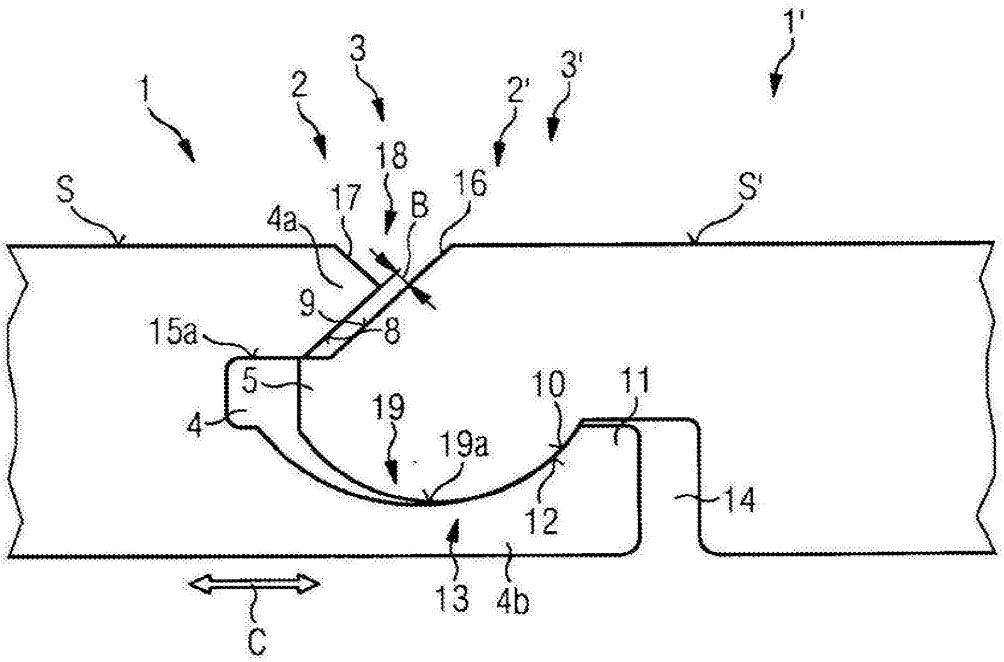


图3b

I4F Exhibit 1003 - 46

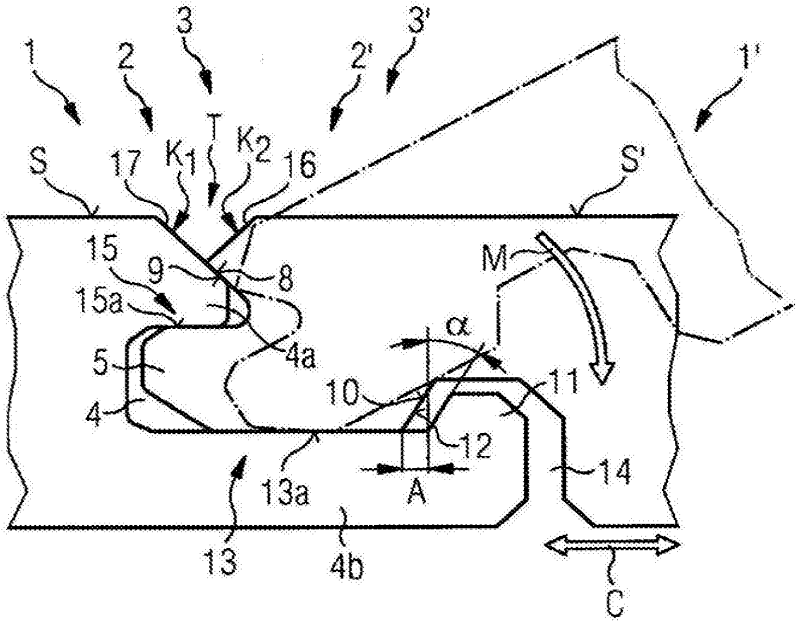


图4a

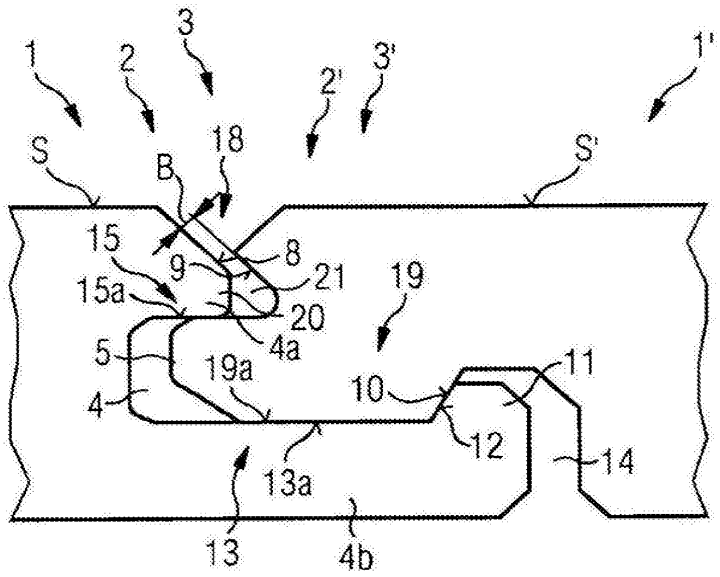


图4b

I4F Exhibit 1003 - 47

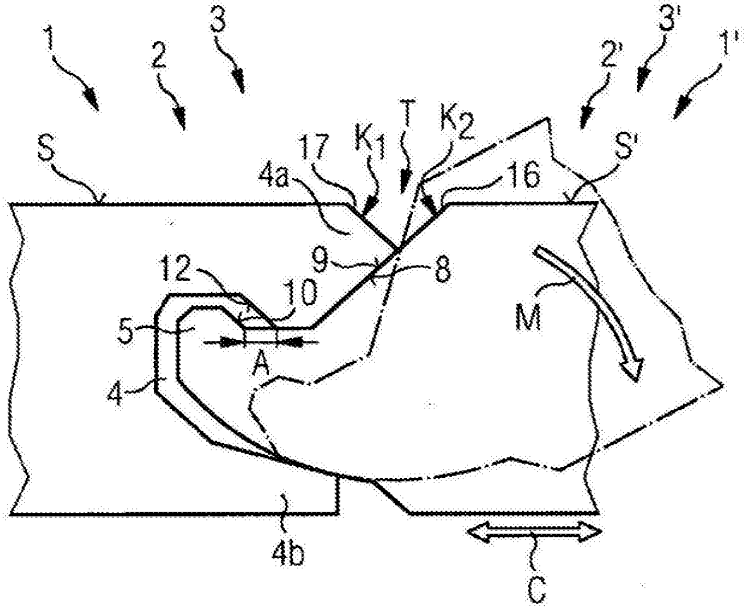


图5a

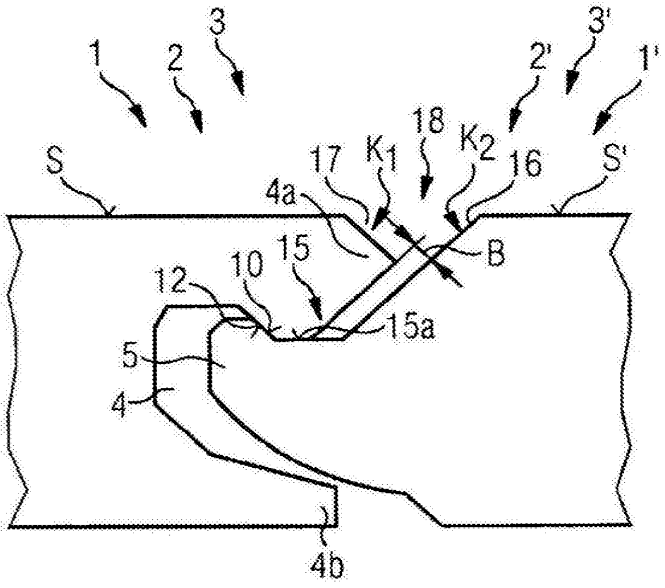


图5b

I4F Exhibit 1003 - 48

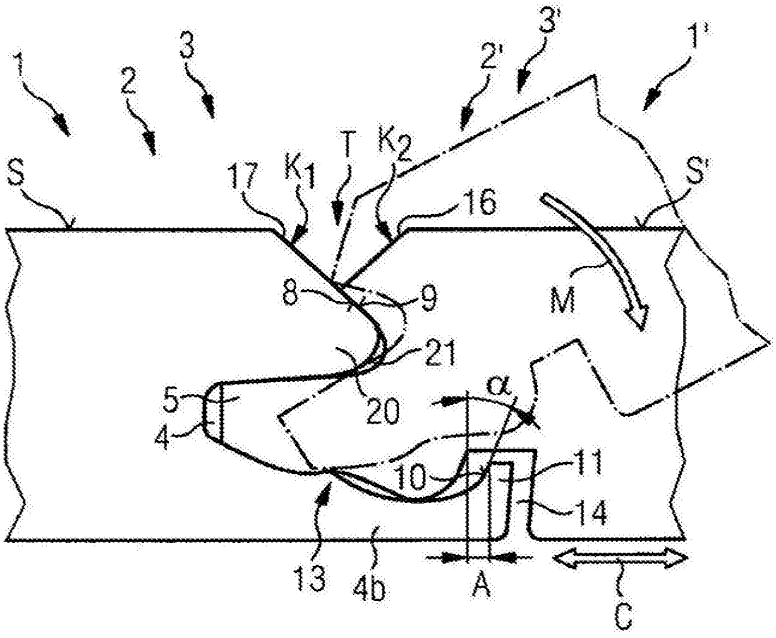


图6a

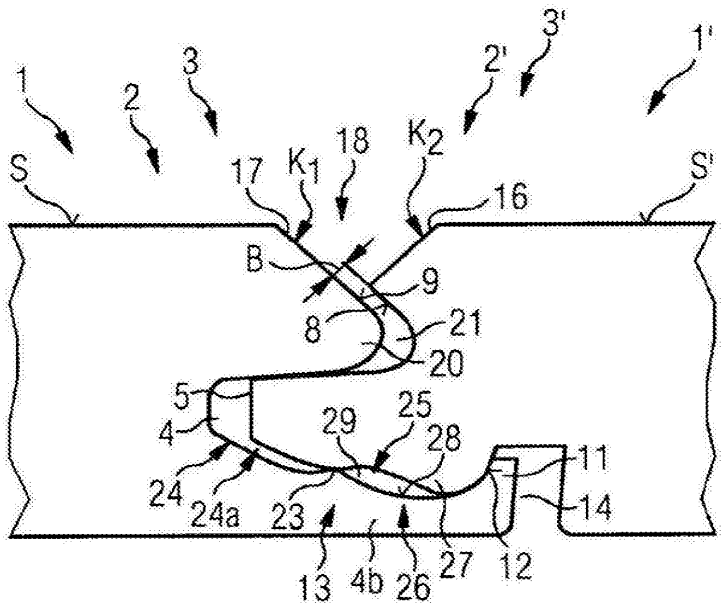


图6b

I4F Exhibit 1003 - 49

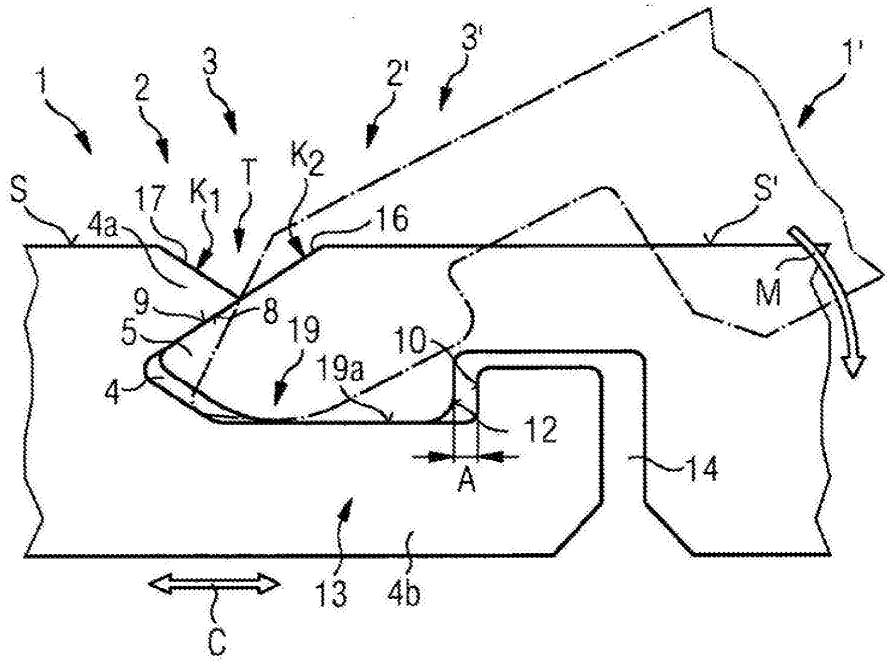


图7a

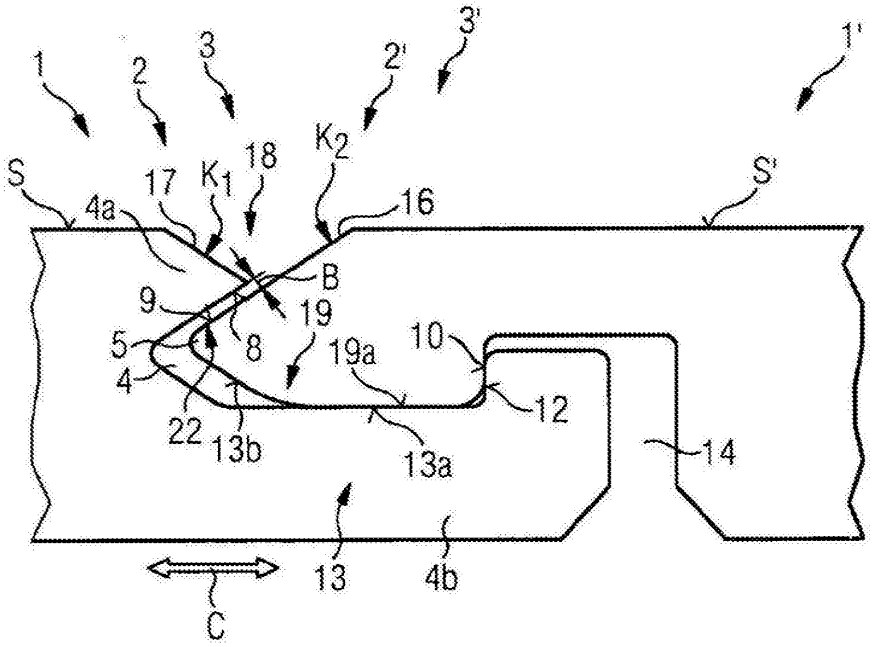


图7b

I4F Exhibit 1003 - 50

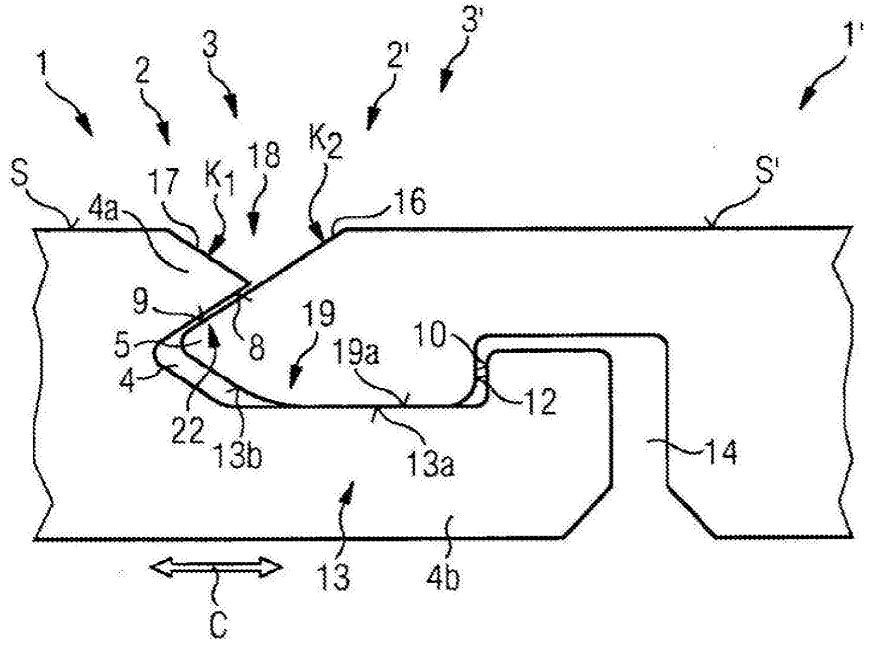


图7c

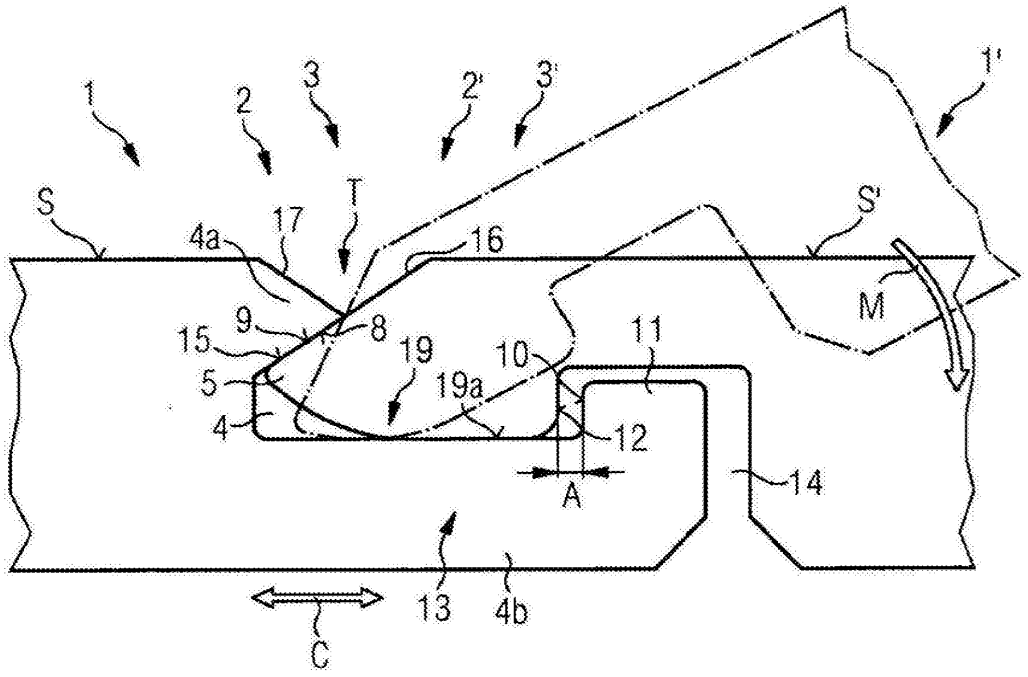


图8a

I4F Exhibit 1003 - 51

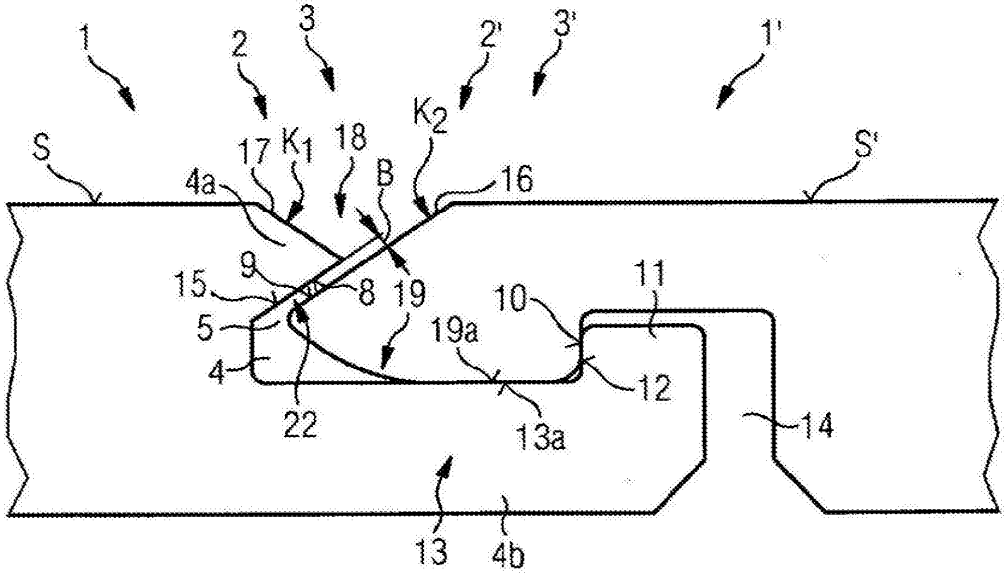


图8b

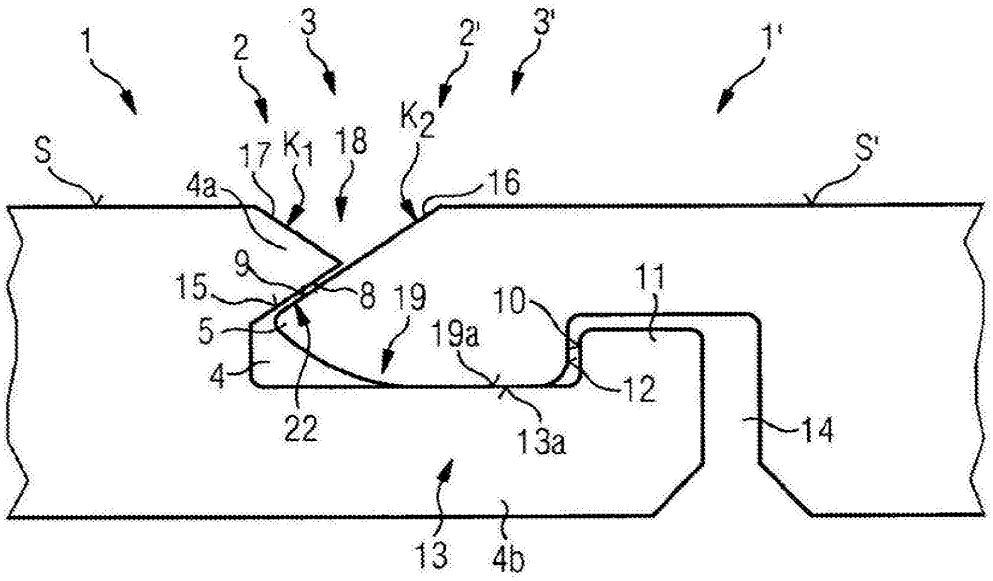


图8c

I4F Exhibit 1003 - 52

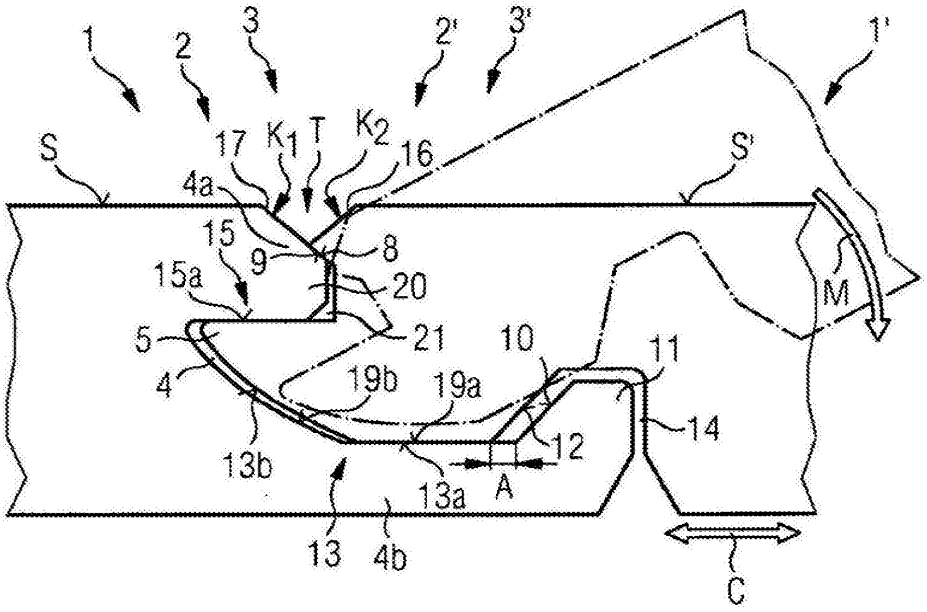


图9a

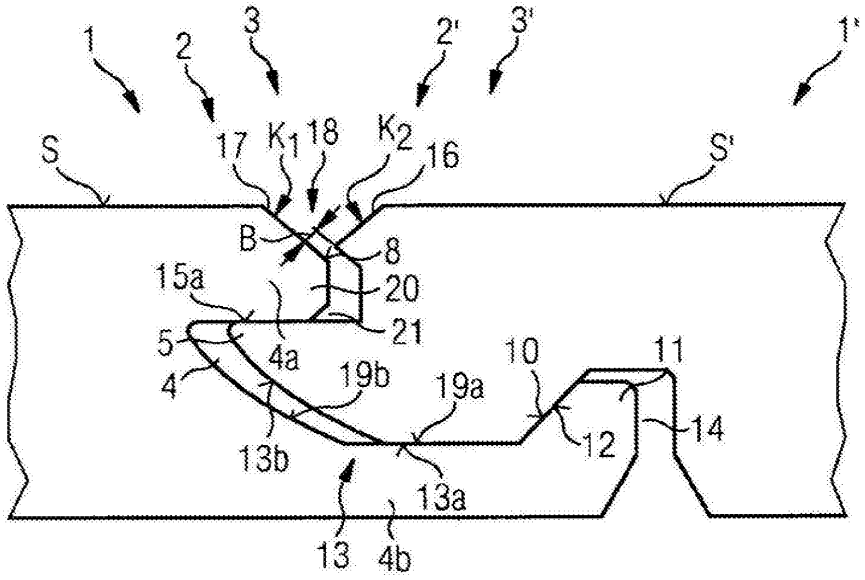


图9b

I4F Exhibit 1003 - 53

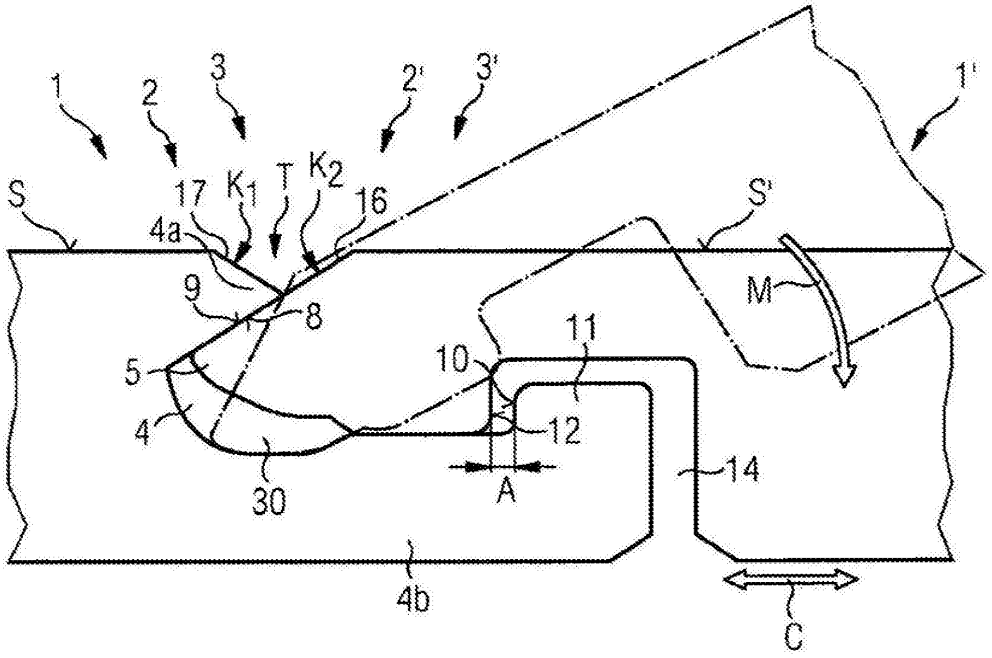


图10a

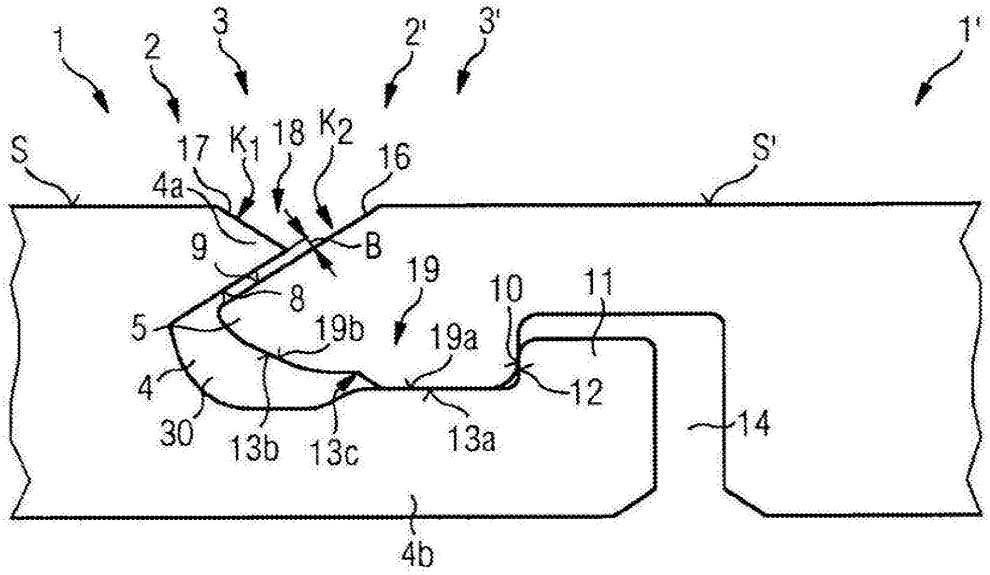


图10b

I4F Exhibit 1003 - 54

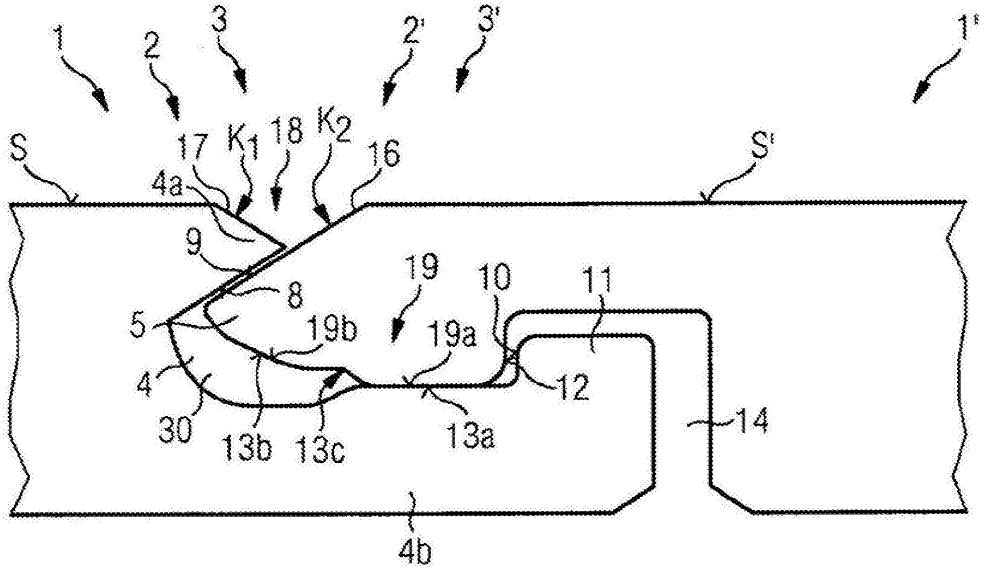


图10c

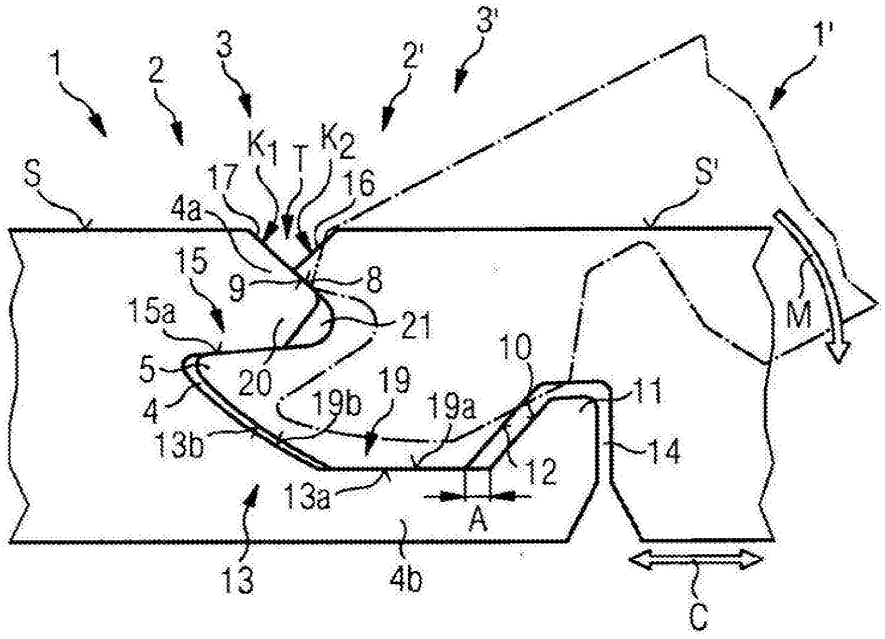


图11a

I4F Exhibit 1003 - 55

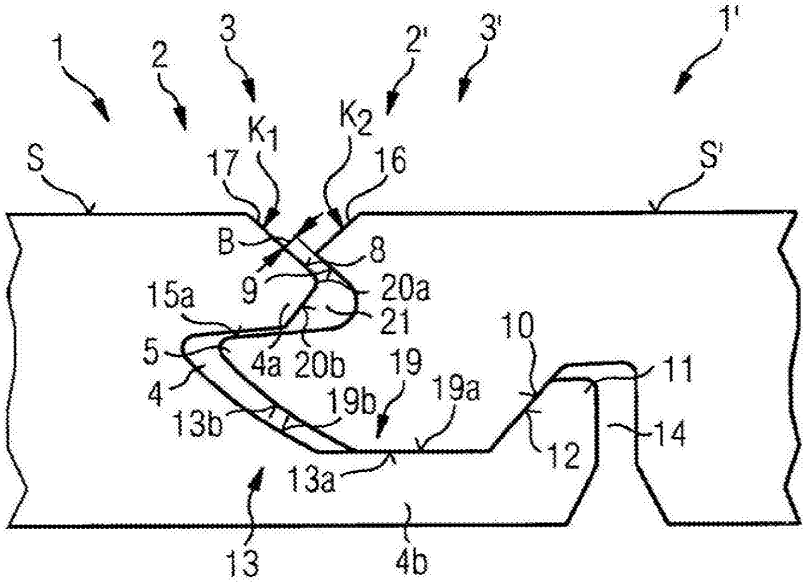


图11b

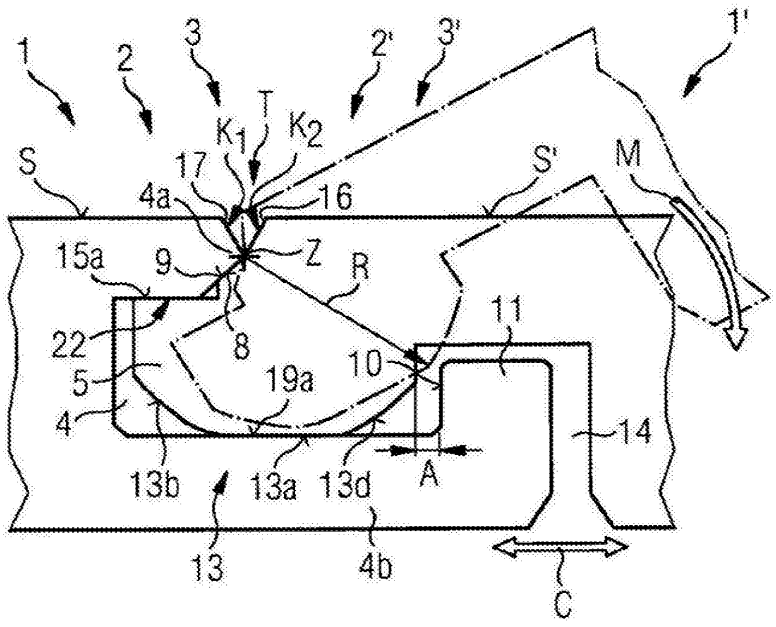


图12a

I4F Exhibit 1003 - 56

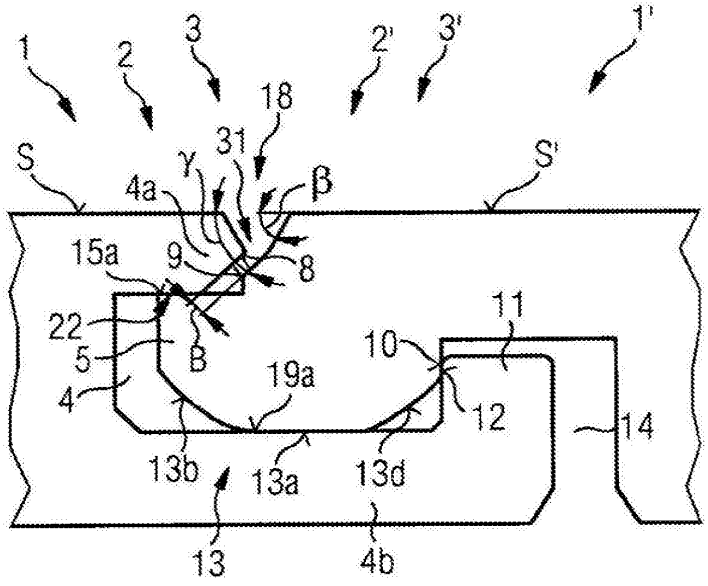


图12b

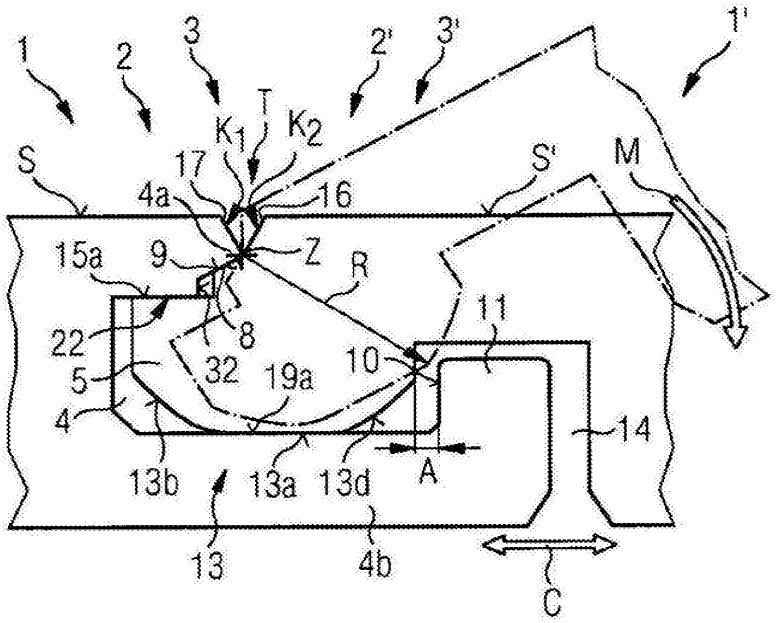


图13a

I4F Exhibit 1003 - 57

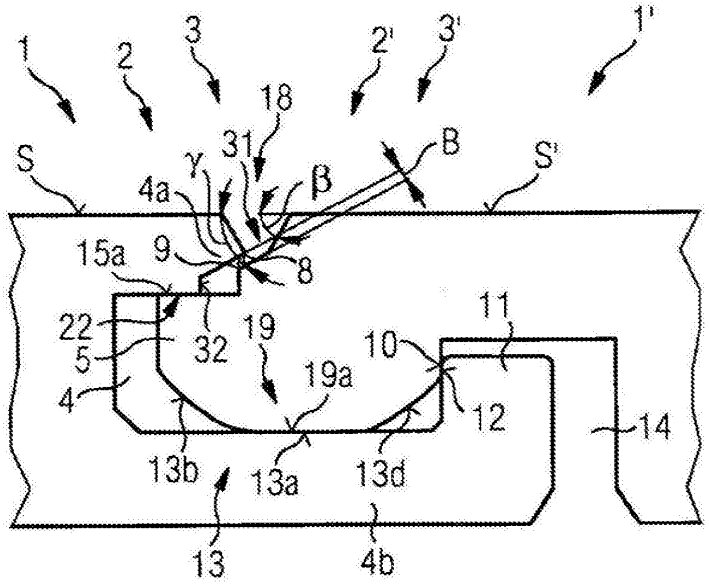


图13b

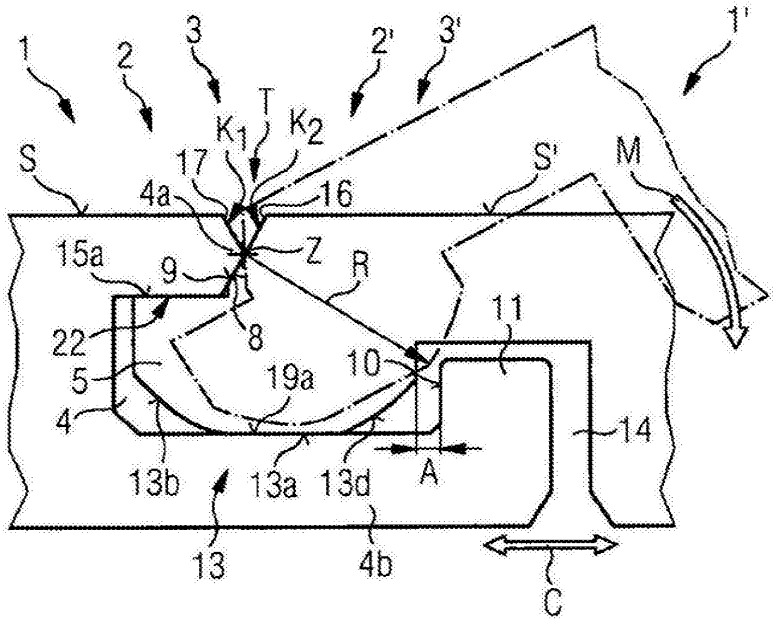


图14a

I4F Exhibit 1003 - 58

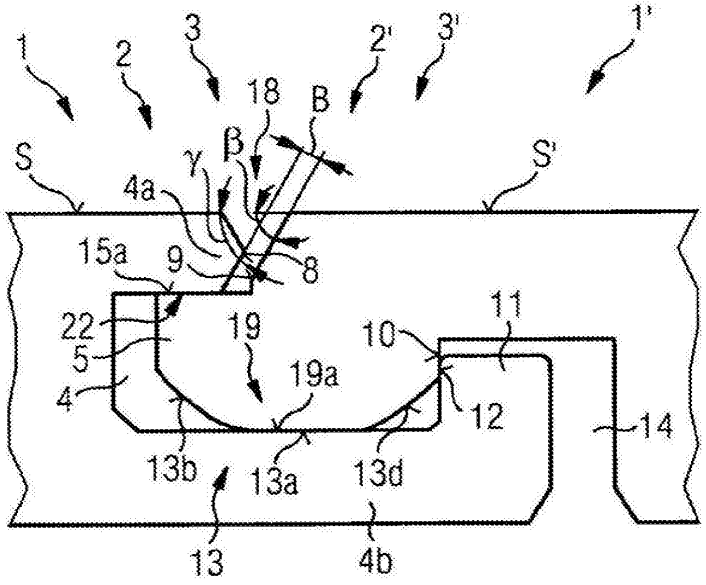


图14b

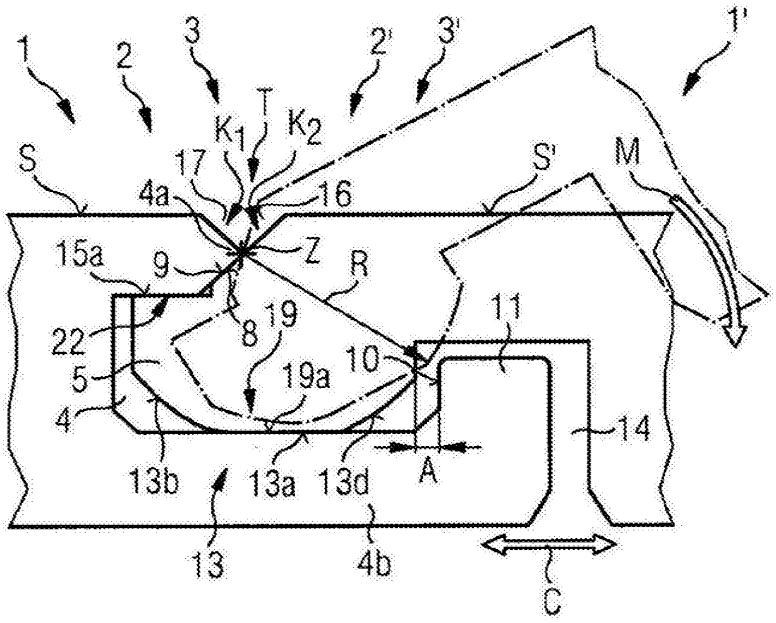


图15a

I4F Exhibit 1003 - 59

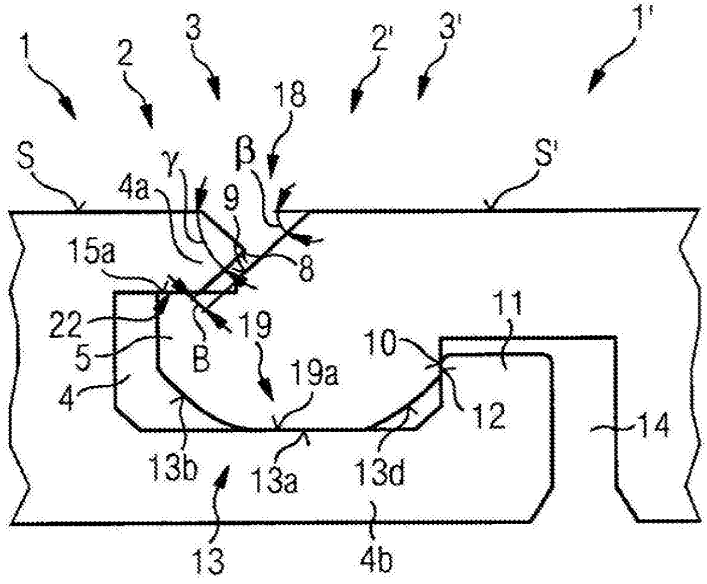


图15b

I4F Exhibit 1003 - 60

Electronic Patent Application Fee Transmittal	
Application Number:	17052836
Filing Date:	04-Nov-2020
Title of Invention:	JOINING SYSTEM FOR FLOOR PANELS
First Named Inventor/Applicant Name:	Bobby Markovski
Filer:	SETH NATTER/Shabana Alli-Arjune
Attorney Docket Number:	A676-3
Filed as Small Entity	

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

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	2806	1	130	130
		Total in USD ($)		**130**

Electronic Acknowledgement Receipt	
EFS ID:	45819391
Application Number:	17052836
International Application Number:	
Confirmation Number:	7468
Title of Invention:	JOINING SYSTEM FOR FLOOR PANELS
First Named Inventor/Applicant Name:	Bobby Markovski
Customer Number:	20999
Filer:	SETH NATTER/Shabana Alli-Arjune
Filer Authorized By:	SETH NATTER
Attorney Docket Number:	A676-3
Receipt Date:	27-MAY-2022
Filing Date:	04-NOV-2020
Time Stamp:	10:58:52
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$130
RAM confirmation Number	E20225QA59074198
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	IDS.pdf	77860 2f525c09f4063995404566f42f03dff062f3dcb7	no	2
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	SB08.pdf	93858 3ddf4ce5a61f36dcf33cce5f91c882472637e64b	no	1
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Other reference-Patent/Application/ Search Documents	CNOA.pdf	772370 45d17e3668bf4f37e578cdf1eade21e62a8f3e11	no	9
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		Total Files Size (in bytes):	3609581		

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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

Applicant:	VILOX AB
First Named Inventor:	Bobby Markovski et al.
Application Serial No.	17/052,836
Filed:	November 4, 2020
For:	JOINING SYSTEM FOR FLOOR PANELS
Examiner:	Chi Q. Nguyen
Art Unit:	3635
Confirmation No.:	7468

INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. § 1.97 (c)

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

Sir:

In compliance with the duty of disclosure set forth in 37 C.F.R. 1.56, Applicant is filing this Information Disclosure Statement and the accompanying form PTO/SB/08a and 08b along with a copy of the prior art therein-cited documents other than US patents and US patent application publications.

Such prior art has come to the attention of Applicant by being cited in the Office Action dated December 3, 2021 issued in the corresponding Chinese patent application number 201980029338.0. So far as Applicant is aware, this Information Disclosure Statement is being filed before the mailing date of the Final Office Action or Notice of Allowance.

Applicant submits herewith an electronic payment by credit card via EFS-Web in the amount of $130.00 as set forth in 37 C.F.R. 1.17(p).

The Examiner is respectfully requested to review the cited documents, make it of record and indicate consideration of the documents by initialing the respective enclosed citation form adjacent the citation of the respective documents. Please return a copy of the initialed citation form to Applicant's undersigned attorney.

The filing of this Information Disclosure Statement is not an admission that the documents identified herein constitute prior art to the present application.

The Commissioner is authorized to charge any fees incurred or credit any overpayment to Deposit Account No. 50-0320.

Respectfully submitted,

HAUG PARTNERS LLP
Attorneys for Applicant

Date: May 27, 2022

By: /Seth Natter/
Seth Natter
Reg. No. 25,122

Haug Partners LLP
745 Fifth Avenue
New York, NY 10151
Tel (212) 588-0800
Fax (212) 588-0500

Attorney Docket No.
A676-3

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: VILOX AB

For: JOINING SYSTEM FOR FLOOR PANELS

Serial No.: 17/052836 Examiner: Chi Q Nguyen

Filed: 11/04/2020 Group Art Unit: 3635

Attorney Docket No.: A676-3 Confirmation No.: 7468

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

AMENDMENT

Honorable Commissioner:

Applicant submits the following response to the Office Action dated 05-APRIL-2022.

Amendments to the Specification comprising an Abstract of the Disclosure begins on page 2;

Remarks begin on page 3.

WHEREFORE, reconsideration and early allowance are earnestly solicited.

Respectfully submitted,
Haug Partners LLP
745 Fifth Avenue
New York, NY 10151
/Seth Natter/
Seth Natter, Reg. No.25122
Tel (212) 588-0800
Fax (212) 588-0500

New York NY
26-MAY-2022

I4F Exhibit 1003 - 68

AMENDMENTS TO THE SPECIFICATION

Please insert the following before Page 1, first paragraph:

ABSTRACT

A joining system for floor panels includes a groove and a tongue on opposite floor panel sides. The tongue is shaped for vertical locking engagement with the groove of an adjoining floor panel in a direction perpendicular to the sides of the panels and parallel to a horizontal floor plane. Two locking recesses are formed in a lower portion of the groove. A first recess is located in an internal portion and a second is located in a lip portion. Two locking lugs are formed in a lower portion of the tongue for engagement with the recesses. A first lug extends downwardly from a tip portion of the tongue and a second lug extends downwardly from a root portion. The first recess and the first lug have curved surfaces. The second recess and the second lug have inclined surfaces.

I4F Exhibit 1003 - 69

REMARKS

Applicants note, with appreciation, the allowance of all remaining claims and the acceptance of the drawings filed 11/04/2020.

Applicants submit herewith an Abstract for insertion in the Specification. As such, the objection to the Specification has been obviated.

WHEREFORE, favorable reconsideration and issuance of a Notice of Allowance and Fees Due is respectfully solicited.

Respectfully submitted,
HAUG PARTNERS LLP
Attorneys for Applicant

Dated: May 26, 2022

By: /Seth Natter/
Seth Natter
Reg. No. 25,122
Haug Partners LLP
745 Fifth Avenue
New York, NY 10151
Tel (212) 588-0800
Fax (212) 588-0500

Electronic Acknowledgement Receipt

EFS ID:	45815076
Application Number:	17052836
International Application Number:	
Confirmation Number:	7468
Title of Invention:	JOINING SYSTEM FOR FLOOR PANELS
First Named Inventor/Applicant Name:	Bobby Markovski
Customer Number:	20999
Filer:	SETH NATTER
Filer Authorized By:	
Attorney Docket Number:	A676-3
Receipt Date:	26-MAY-2022
Filing Date:	04-NOV-2020
Time Stamp:	16:53:00
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	sb0021transmittal.pdf	247762 89f996629ecb09616340d7d7d6dc1813ed88be67	no	2

Warnings:

Information:					
2	Amendment/Request for Reconsideration-After Non-Final Rejection	Amendment_.pdf	38273 7df0646b4a266dea780b5da2157897e82c11fece	no	1
Warnings:					
Information:					
3	Specification	Abstract.pdf	25566 7d793944fbe0b7d903ee384c59bc7c72d54e7a74	no	1
Warnings:					
Information:					
4	Applicant Arguments/Remarks Made in an Amendment	Remarks.pdf	25140 20a1e9eca55d1f87ee419d831e035d16169f2532	no	1
Warnings:					
Information:					
		Total Files Size (in bytes):	336741		

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.

Doc Code: TRAN.LET

Document Description: Transmittal Letter

PTO/SB/21 (07-09)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

Application Number	17052836
Filing Date	11-04-2020
First Named Inventor	Markovski
Art Unit	3635
Examiner Name	Nguyen
Attorney Docket Number	A676-3

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☑ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☐ Other Enclosure(s) (please Identify below):

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Hayg Partners LLP		
Signature	/Seth Natter/		
Printed name	Seth Natter		
Date	26-MAY-2022	Reg. No.	25122

CERTIFICATE OF TRANSMISSION/MAILING

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

Signature			
Typed or printed name		Date	

This collection of information is required by 37 CFR 1.5. 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 and1.14. This collection is estimated to 2 hours 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.

Privacy Act Statement

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

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

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/052,836	11/04/2020	Bobby Markovski	A676-3	7468

20999 7590 04/05/2022

HAUG PARTNERS LLP
745 FIFTH AVENUE - 10th FLOOR
NEW YORK, NY 10151

EXAMINER	
NGUYEN, CHI Q	

ART UNIT	PAPER NUMBER
3635	

NOTIFICATION DATE	DELIVERY MODE
04/05/2022	ELECTRONIC

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

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

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

docket@haugpartners.com

Office Action Summary	Application No. 17/052,836	Applicant(s) Markovski et al.	
	Examiner CHI Q NGUYEN	Art Unit 3635	AIA (FITF) Status Yes

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

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

Status

1)☑ Responsive to communication(s) filed on 2/15/2022.

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

2a)☐ This action is **FINAL.** 2b) ☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☑ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-15 is/are pending in the application.

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

6) ☑ Claim(s) 1-15 is/are allowed.

7) ☐ Claim(s) _____ is/are rejected.

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

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

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

Application Papers

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

11)☑ The drawing(s) filed on 11/4/2020 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

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

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

Priority under 35 U.S.C. § 119

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

Certified copies:

a)☑ All b)☐ Some** c)☐ None of the:

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

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

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

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

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

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

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

4) ☐ Other: _____.

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.

The *Ex parte Quayle* action is in response to Applicant's amendment filed on 2/15/2022

Specification

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words in length. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," or "The invention relates", etc. In addition, the form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided.

This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required. The WO 2019/211460 abstract is not acceptable.

Allowable Subject Matter

Claims 1-15 are allowed.

The following is an examiner's statement of reasons for allowance: no prior art discloses combination structures for a joining system, which including dual consecutive locking lugs arranged in a lower portion of the tongue for horizontally interlocking engagement in the groove, a first locking lug extending downwardly from a lower tip portion of the tongue and a second locking lug extending downwardly from a root portion of the tongue, the first locking recess and the first locking lug are

provided with matching curved horizontal locking surfaces and the second locking recess and the second locking lug are provided with matching inclined horizontal locking surfaces as set forth in the claims.

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

Response to Arguments

Applicant's arguments with respect to claim(s) 1-15 have been considered and the previous rejection has been withdrawn.

This application is in condition for allowance except for the following formal matters:

The Abstract is missing (see objection above).

Prosecution on the merits is closed in accordance with the practice under *Ex parte Quayle*, 25 USPQ 74, 453 O.G. 213, (Comm'r Pat. 1935).

A shortened statutory period for reply to this action is set to expire **TWO (2) MONTHS** from the mailing date of this letter. Extensions of time may be granted under 37 CFR 1.136 but in no case can any extension carry the date for reply to this Office action beyond the maximum period of SIX MONTHS set by statute (35 U.S.C. 133).

Any inquiry concerning this communication or earlier communication from the examiner should be directed to CHI Q. NGUYEN whose telephone number is (571) 272-6847. The examiner can normally be reached on Monday-Friday from 7AM-5PM or email: chi.nguyen@uspto.gov. If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Mattei can be reached at (571) 270-3238. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see

http://pairdirect.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at (866) 217-9197.

/CHI Q NGUYEN/

Primary Examiner, Art Unit 3635



Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/052,836	Markovski et al.
	Examiner	Art Unit
	CHI Q NGUYEN	3635

CPC - Searched*		
Symbol	**Date**	**Examiner**
(e04f15/02033 OR e04f15/02038 OR e04f15/107 OR e04f15/102 OR e04f2201/042 OR e04f2201/0107 OR e04f2201/03 OR e04f15/02038 OR e04f2201/0552 OR e04f2201/023 OR e04f2201/0535 OR e04f2201/0146 OR e04f2201/043 OR e04f2201/0547 OR e04f2201/0153 OR e04f2201/0138 OR e04f2201/042).cpc.	12/02/2021	CN

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

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**
52	592.1, 592.3,592.2,578,588.1,309.1,309.3	12/02/2021	CN

* 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**
PALM inventor name; BRS and related arts FW/BW search	12/02/2021	CN
Update search	03/31/2022	CN

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
	(floor and panel and groove and tongue and recess).clm.	03/31/2022	CN

/CHI Q NGUYEN/ Primary Examiner, Art Unit 3635	

I4F Exhibit 1003 - 80

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	36832	(e04f15/02033 OR e04f15/02038 OR e04f15/107 OR e04f15/102 OR e04f2201/042 OR e04f2201/0107 OR e04f2201/03 OR e04f15/02038 OR e04f2201/0552 OR e04f2201/023 OR e04f2201/0535 OR e04f2201/0146 OR e04f2201/043 OR e04f2201/0547 OR e04f2201/0153 OR e04f2201/0138 OR e04f2201/042).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/31 08:59 AM
L2	212	floor AND panel AND groove AND tongue AND lug AND recess AND L1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/31 09:04 AM
L3	9458	(52/592.1,592.3,592.2,578,588.1,309.1,309.3).ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/31 09:08 AM
L4	17	floor AND panel AND groove AND tongue AND lug AND recess	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY,	OR	ON	ON	2022/03/31 09:09 AM

I4F Exhibit 1003 - 81

		AND L3	CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L5	26	(Artificial Intelligence) More Like: US-7337588-B1 Text: (JP-2004518042-A OR US-20020112433-A1 OR US-6769218-B2 OR JP-4405149-B2 OR US-20020020127-A1 OR EP-1215351-A3 OR LV-12741-A OR LT-2001085-A OR YU-62401-A OR HU-0105354-A2 OR EE-200100442-A OR DE-50004151-D1 OR AT-252674-T OR HU-0105354-A3 OR HK-1038385-A1 OR AU-3424100-A OR PL-349278-A1 OR US-7600354-B2 OR US-7980043-B2 OR EP-1793065-B1).did.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/31 09:10 AM
L6	39	(Artificial Intelligence) More Like: US-20040250492-A1 Text: (IL-156528-A OR EP-2795017-A1 OR WO-2013092270-A1 OR EP-1349994-B1 OR CN-110998041-A OR WO-2007012137-A1 OR EP-1913214-A1 OR CA-2616611-A1 OR US-20080216435-A1 OR BE-1027634-B1 OR CN-101278099-A OR US-20040035080-A1 OR JP-3461569-B2 OR US-7150135-B2 OR BR-0213889-A OR CA-2672877-A1 OR FR-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/03/31 09:13 AM

		2831908-B1 OR DE-69927184-D1 OR DE-69927184-T2 OR CA-3133140-A1).did.					

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	347	(floor AND panel AND groove AND tongue AND recess).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/03/31 09:17 AM

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 17/052,836	Filing Date 11/04/2020	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $240 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	02/15/2022	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 15	Minus	** 20	= 0		x $50 =	0
	Independent (37 CFR 1.16(h))	* 1	Minus	*** 3	= 0		x $240 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

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

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

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

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: VILOX AB

For: JOINING SYSTEM FOR FLOOR PANELS

Serial No.: 17/052836 Examiner: Chi Q Nguyen

Filed: 11/04/2020 Group Art Unit: 3635

Attorney Docket No.: A676-3 Confirmation No.: 7468

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

SUPPLEMENTAL AMENDMENT

Honorable Commissioner:

Applicant supplements the Amendment filed February 7, 2022 by withdrawing the claims filed therewith and submitting a set of replacement claims:

A complete listing of replacement claims, including amendments, begins on page 2.

WHEREFORE, reconsideration and early allowance are earnestly solicited.

Respectfully submitted,
Haug Partners LLP
745 Fifth Avenue
New York, NY 10151
/Seth Natter/
Seth Natter, Reg. No.25122
Tel (212) 588-0800
Fax (212) 588-0500

New York NY
15-FEB-2022

COMPLETE LISTING OF CLAIMS INCLUDING AMENDMENTS

1. (Currently Amended) A joining system for floor panels, said floor panels comprising coupling parts on at least two opposite sides for joining floor panel together, said coupling parts including a groove and a tongue, where the groove is shaped for insertion of ~~a~~ the tongue ~~on~~ of an adjoining floor panel , said tongue of the adjoining floor panel being shaped for locking engagement ~~by means of integrated locking means~~ with the groove in a direction perpendicular to said sides and parallel to a horizontal floor plane defined by the joined panels, said coupling parts exerting a tension force towards each other in a mutually engaged position, the tension force being achieved by elastic compression of the material of the coupling parts, locking means for locking the tongue of the adjoining floor panel within the groove, wherein the locking means comprises dual consecutive locking recesses arranged in a lower portion of the groove, a first locking recess ~~of which being~~ located in an internally extending portion within the groove and a second locking recess ~~of which being~~ located in a lip portion protruding from an entrance opening of the groove, the locking means further comprises dual consecutive locking lugs arranged in a lower portion of the tongue for horizontally interlocking engagement in the groove, a first locking lug ~~of which extends~~ extending downwardly from a lower tip portion of the tongue and a second locking lug ~~of which extends~~ extending downwardly from a root portion of the tongue, the first locking recess and the first locking lug are provided with matching curved horizontal locking surfaces and the second locking recess and the second locking lug are provided with matching inclined horizontal locking surfaces.

2. (Previously Presented) The joining system for floor panels according to claim l , wherein an intermediate transitional ridge between the first locking lug and the second locking lug is located

I4F Exhibit 1003 - 86

inside of the entrance opening of the groove, said entrance opening being located in a main vertical joint plane between two joined floor panels.

3. (Currently Amended) The joining system for floor panels according to claim l , wherein an intermediate transitional ridge between the first locking lug and the second locking lug is aligned with the entrance opening of the groove, said entrance opening being located in a main vertical joint plane between two joined panels ~~(1)~~.

4. (Currently Amended) The joining system for floor panels according to claim l, wherein ~~in that~~ the lower tip portion of the tongue is curved.

5. (Previously Presented) The joining system for floor panels according to claim 4, wherein the curvature of the curved lower tip portion of the tongue merges continuously with a corresponding curvature of the horizontal locking surface of the first locking lug.

6. (Previously Presented) The joining system for floor panels according to claim l, wherein the first locking recess is shallower than the second locking recess.

7. (Currently Amended)) The joining system for floor panels according to claim l, wherein the ~~depth of~~ the first locking recess <u>extends downwardly to a depth and the second locking recess extends downwardly to a depth, the depth of the first locking recess</u> is less than half of the depth of the second locking recess.

8. (Previously Presented) The joining system for floor panels according to claim l, wherein an exit tangent inclination angle of the curved horizontal locking surface of the first locking recess is less than the inclined locking angle of the second locking recess.

I4F Exhibit 1003 - 87

9. (Previously Presented) The joining system for floor panels according to claim 8, wherein said exit tangent inclination angle of the curved horizontal locking surface of the first locking recess is equal to or less than half the inclined locking angle of the second locking recess.

10. (Previously Presented) The joining system for floor panels according to claim l, wherein the curved horizontal locking surface extends from a point located essentially directly below a radial center of the curved first locking recess in a direction towards the second locking recess.

11. (Currently Amended) The joining system for floor panels according to claim 3, ~~wherein the height of~~ the intermediate transitional ridge having a height measured from a bottom plane of the floor panel ~~ridge is~~ and a corresponding inlet ridge of the second locking recess having a height, the height of the intermediate transitional ridge being equal to or less than the ~~corresponding~~ height of ~~a corresponding~~ an inlet ridge of the second locking recess.

12. (Currently Amended) The joining system for floor panels according to claim l, wherein the ~~length of~~ tongue includes a vertical locking surface having a length and the groove includes a vertical locking surface having a length, the vertical locking surface of the tongue being ~~of the tongue is~~ less than the ~~corresponding~~ length of the ~~a matching~~ vertical locking surface of the groove.

13. (Currently Amended) The joining system for floor panels according to claim l, wherein a ~~the~~ minimum thickness between the first locking recess and a bottom plane of the of the floor panel exceeds a third of the total height of the floor panel.

14. (Currently Amended) The joining system for floor panels according to claim l, wherein the groove includes an introduction angle ~~of the groove is~~ ,the introduction angle of the groove

being equal to or greater than 10 degrees.

15. (Previously Presented) The joining system for floor panels according to claim l, wherein the length of the internally extending portion within the groove is less than the length of the lip portion protruding from an entrance opening of the groove.

Doc Code: TRAN.LET

Document Description: Transmittal Letter

PTO/SB/21 (07-09)
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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

Application Number	17/052,836
Filing Date	11-04-2020
First Named Inventor	Markovski
Art Unit	3635
Examiner Name	Nguyen
Attorney Docket Number	A676-3

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☑ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☐ Other Enclosure(s) (please Identify below):

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Haug Partners LLP		
Signature	/Seth Natter/		
Printed name	Seth Natter		
Date	15-FEB-2022	Reg. No.	25122

CERTIFICATE OF TRANSMISSION/MAILING

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Signature			
Typed or printed name		Date	

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Electronic Acknowledgement Receipt	
EFS ID:	45001316
Application Number:	17052836
International Application Number:	
Confirmation Number:	7468
Title of Invention:	JOINING SYSTEM FOR FLOOR PANELS
First Named Inventor/Applicant Name:	Bobby Markovski
Customer Number:	20999
Filer:	Jon Gordon/Shabana Alli-Arjune
Filer Authorized By:	Jon Gordon
Attorney Docket Number:	A676-3
Receipt Date:	15-FEB-2022
Filing Date:	04-NOV-2020
Time Stamp:	14:49:11
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		SupplementalResponse.pdf	127936 2b60843b2c71f4637bcc8ee633a3aff6aba95efb	yes	5

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Supplemental Response or Supplemental Amendment	1	1
	Claims	2	5

Warnings:					
Information:					
2	Transmittal Letter	Transmittal.pdf	553419 0fdc37fafbf7a405761f006c659fb0f4da7ab61b	no	1
Warnings:					
Information:					
		Total Files Size (in bytes):	681355		

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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.

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 17/052,836	Filing Date 11/04/2020	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $240 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	02/07/2022	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 15	Minus	** 20	= 0		x $50 =	0
	Independent (37 CFR 1.16(h))	* 1	Minus	*** 3	= 0		x $240 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

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

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	SLIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/KIMBERLY D WILLIAMS/
*** 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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Attorney Docket No.
A676-3

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: VILOX AB

For: JOINING SYSTEM FOR FLOOR PANELS

Serial No.: 17/052836 Examiner: Chi Q Nguyen

Filed: 11/04/2020 Group Art Unit: 3635

Attorney Docket No.: A676-3 Confirmation No.: 7468

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

AMENDMENT

Honorable Commissioner:

Applicant submits the following response to the Office Action dated December 7, 2021, and respectfully requests reconsideration:

A complete listing of claims, including amendments, begins on page 2;

Remarks begin on page 6.

WHEREFORE, reconsideration and early allowance are earnestly solicited.

Respectfully submitted,
Haug Partners LLP
745 Fifth Avenue
New York, NY 10151
/Seth Natter/
Seth Natter, Reg. No.25122
Tel (212) 588-0800
Fax (212) 588-0500

New York NY
07-FEB-2022

I4F Exhibit 1003 - 94

COMPLETE LISTING OF CLAIMS INCLUDING AMENDMENTS

1. (Currently Amended) A joining system for floor panels, said floor panels comprising coupling parts on at least two opposite sides for joining floor panel together, said coupling parts including a groove and a tongue, where the groove is shaped for insertion of ~~a~~ the tongue ~~on~~ of an adjoining floor panel , said tongue of the adjoining floor panel being shaped for locking engagement ~~by means of integrated locking means~~ with the groove in a direction perpendicular to said sides and parallel to a horizontal floor plane defined by the joined panels, said coupling parts exerting a tension force towards each other in a mutually engaged position, the tension force being achieved by elastic compression of the material of the coupling parts, locking means for locking the tongue of the adjoining floor panel within the groove, wherein the locking means comprises dual consecutive locking recesses arranged in a lower portion of the groove, a first locking recess ~~of which being~~ located in an internally extending portion within the groove and a second locking recess ~~of which being~~ located in a lip portion protruding from an entrance opening of the groove, the locking means further comprises dual consecutive locking lugs arranged in a lower portion of the tongue for horizontally interlocking engagement in the groove, a first locking lug ~~of which extends~~ extending downwardly from a lower tip portion of the tongue and a second locking lug ~~of which extends~~ extending downwardly from a root portion of the tongue, the first locking recess and the first locking lug are provided with matching curved horizontal locking surfaces and the second locking recess and the second locking lug are provided with matching inclined horizontal locking surfaces.

I4F Exhibit 1003 - 95

2. (Previously Presented) The joining system for floor panels according to claim l , wherein an intermediate transitional ridge between the first locking lug and the second locking lug is located inside of the entrance opening of the groove, said entrance opening being located in a main vertical joint plane between two joined floor panels.

3. (Currently Amended) The joining system for floor panels according to claim l , wherein an intermediate transitional ridge between the first locking lug and the second locking lug is aligned with the entrance opening of the groove, said entrance opening being located in a main vertical joint plane between two joined panels ~~(1)~~.

4. (Currently Amended) The joining system for floor panels according to claim l, wherein ~~in that~~ the lower tip portion of the tongue is curved.

5. The joining system for floor panels according to claim 4, wherein the curvature of the curved lower tip portion of the tongue merges continuously with a corresponding curvature of the horizontal locking surface of the first locking lug.

6. (Previously Presented) The joining system for floor panels according to claim l, wherein the first locking recess is shallower than the second locking recess.

7. (Currently Amended)) The joining system for floor panels according to claim l, wherein the ~~depth of~~ the first locking recess <u>extends downwardly to a depth and the second locking recess extends downwardly to a depth, the depth of the first locking recess</u> is less than half of the depth of the second locking recess.

I4F Exhibit 1003 - 96

8. (Previously Presented) The joining system for floor panels according to claim l, wherein an exit tangent inclination angle of the curved horizontal locking surface of the first locking recess is less than the inclined locking angle of the second locking recess.

9. (Previously Presented) The joining system for floor panels according to claim 8, wherein said exit tangent inclination angle of the curved horizontal locking surface of the first locking recess is equal to or less than half the inclined locking angle of the second locking recess.

10. (Previously Presented) The joining system for floor panels according to claim l, wherein the curved horizontal locking surface extends from a point located essentially directly below a radial center of the curved first locking recess in a direction towards the second locking recess.

11. (Currently Amended) The joining system for floor panels according to claim 3, ~~wherein the height of~~ the intermediate transitional ridge having a height measured from a bottom plane of the floor panel ~~ridge is~~ and a corresponding inlet ridge of the second locking recess having a height, the height of the intermediate transitional ridge being equal to or less than the ~~corresponding~~ height of ~~a corresponding~~ an inlet ridge of the second locking recess.

12. (Currently Amended) The joining system for floor panels according to claim l, wherein the ~~length of~~ tongue includes a vertical locking surface having a length and the groove includes a vertical locking surface having a length, the vertical locking surface of the tongue being ~~of the tongue is~~ less than the ~~corresponding~~ length of the ~~a matching~~ vertical locking surface of the groove.

I4F Exhibit 1003 - 97

13. (Currently Amended) The joining system for floor panels according to claim l, wherein a ~~the~~ minimum thickness between the first locking recess and a bottom plane of the of the floor panel exceeds a third of the total height of the floor panel.

14. (Currently Amended) The joining system for floor panels according to claim l, wherein the groove includes an introduction angle ~~of the groove is~~ ,the introduction angle of the groove being equal to or greater than 10 degrees.

15. (Previously Presented) The joining system for floor panels according to claim l, wherein the length of the internally extending portion within the groove is less than the length of the lip portion protruding from an entrance opening of the groove.

REMARKS

There are 15 claims remaining in the application with Claim 1 being the sole independent claim.

Claims 1 through 15 have been amended to overcome the rejections raised pursuant to 35 UCS §112 (b) as well as the objection raised with respect to claim 13.

All claims have been rejected under 35 USC §102 (a)(1) as being anticipated by the ninth embodiment of Thiers, (2002/0020127), which is illustrated in Thiers FIGS. 20-23. It is respectfully submitted that such rejection is in error and is premised upon a misinterpretation of the drawing figures and the Thiers specification.

Claim 1 specifies a joining system for floor panels comprising coupling parts including a groove and a tongue, the groove being shaped for insertion of the tongue of an adjoining floor panel , said tongue of the adjoining floor panel being shaped for locking engagement with the groove ...locking means for locking the tongue of the adjoining floor panel within the groove comprising dual consecutive locking recesses arranged in a lower portion of the groove, a first locking recess located in an internally extending portion within the groove and a second locking recess located in a lip portion protruding from an entrance opening of the groove, dual consecutive locking lugs arranged in a lower portion of the tongue for horizontally interlocking engagement in the groove, a first locking lug extending downwardly from a lower tip portion of the tongue and a second locking lug extending downwardly from a root portion of the tongue, the first locking recess and the first locking lug being provided with matching curved horizontal locking surfaces and the second locking recess and the second locking lug being provided with matching inclined horizontal locking surfaces.

I4F Exhibit 1003 - 99

The Thiers ninth embodiment floor panel joining structure is specifically configured to permit unlocking of previously conjoined floor panels by turning coupled edges toward one another at their bottoms, as illustrated in FIGS. 22 and 23.

Thiers states "...two connected panels 2 can be turned about their coupled edges towards one another toward their bottom side, starting from a flat position, over at least a certain angle on the one hand, whereby this turning movement makes it possible for the two above-mentioned panels 2 to be removed from between other adjacent panels...." ¶[0150];... the coupling means 7 are made such that, as represented in FIG. 22, they make it possible for the two panels 2 to be lifted at their coupled edges 3-4, from a flat position, such that there is a disconnection on at least one of the opposite edges which provide for the connection with the adjacent panels 2D and 2E. Thus, the panels 2 can be removed from an existing floor covering 1 by first lifting them as mentioned above and by subsequently turning the left panel 2 from FIG. 22 up, as represented by means of a dot and dash line, so that the left panel 2 of FIG. 22 can be removed. Next, also the right panel 2 can be removed....¶[0151].

Significantly absent from Thiers structure are Applicant's claimed dual consecutive locking recesses and dual consecutive locking lugs. The Theirs interlock is only premised upon the single engagement of two interlocking elements, 13 and 47. Thiers states at¶[0153]:

"the interlocking is mainly obtained in the horizontal direction by means of an interlocking part 13 on the lip 11 and an interlocking part 47 on the bottom side of the other panel 2 working in conjunction with it....

In the interlocked position (Thiers, FIG. 21) vertical spaces 48 and 49 are provided beneath 47 and above 13 respectively as well as a lateral space S to permit uncoupling by rotating the panels toward the FIG. 23 orientation ¶[0154].

The lower portion of groove 9 of Thiers (FIGS. 20-23) is flat, i.e., planar ; it does not include Applicant's claimed first locking recess and certainly does not disclose Applicant's claimed curved horizontal locking surface. The only recess in Thiers is the recess 49, which functions only to permit rotation of the panels to the intermediate FIG.23 position and does not serve any locking function. The locked position is shown only in FIG. 21.

Further, to provide a recess in the lower portion of groove 9 would hinder the intended separation of the panels. Thiers intent and embodying structure is premised only upon the interlocking engagement of elements 13 and 47 as stated at ¶[0153].

Claim 1 is directed to novel subject matter, not obvious and clearly allowable.

Claim 2, dependent from Claim 1 further specifies an intermediate transitional ridge between the first locking lug and the second locking lug is located inside of the entrance opening of the groove, said entrance opening being located in a main vertical joint plane between two joined floor panels. Thiers discloses but a single locking lug 47. Claim 2 is clearly allowable in view of its dependency from Claim 1 as well as by virtue of the inclusion of patentable subject matter.

Claim 3 further defines the invention by The joining system for floor panels according to claim l , wherein an intermediate transitional ridge between the first locking lug and the second locking lug is aligned with the entrance opening of the groove, said entrance opening being located in a main vertical joint plane between two joined panels. Claim 3 is clearly allowable for the reasons stated with respect to Claim 2.

Claim 4 further defines the invention by specifying that the lower tip portion of the tongue is curved. Such structure is absent from Thiers. Claim 4 is clearly allowable in view of its dependency from Claim 1 as well as by virtue of the inclusion of patentable subject matter.

Claim 5 specifies the curvature of the curved lower tip portion of the tongue merges continuously with a corresponding curvature of the horizontal locking surface of the first locking lug. Such structure is absent from Thiers. Claim 5 is clearly allowable in view of its dependency from Claim 1 as well as by virtue of the inclusion of patentable subject matter.

Claim 6 specifies that the first locking recess is shallower than the second locking recess. Thiers does not disclose a first locking recess. Claim 6 is clearly allowable.

Claim 7 specifies that the first locking recess extends downwardly to a depth and the second locking recess extends downwardly to a depth, the depth of the first locking recess is less than half of the depth of the second locking recess. Thiers does not disclose a first locking recess. Claim 7 is clearly allowable.

Claim 8 specifies an exit tangent inclination angle of the curved horizontal locking surface of the first locking recess is less than the inclined locking angle of the second locking recess. Thiers does not disclose a first locking recess. Claim 8 is clearly allowable.

Claim 9, dependent from Claim 8, provides said exit tangent inclination angle of the curved horizontal locking surface of the first locking recess is equal to or less than half the inclined locking angle of the second locking recess. This claim is clearly allowable for the reasons set forth with respect to Claim 8.

Claim 10 provides that the curved horizontal locking surface extends from a point located essentially directly below a radial center of the curved first locking recess in a direction towards the second locking recess. Thiers does not disclose a first locking recess. Claim 10 is clearly allowable.

Claim 11, dependent from Claim 3, provides that the intermediate transitional ridge includes a height measured from a bottom plane of the floor panel and a corresponding inlet ridge of the second locking recess includes a height, the height of the intermediate transitional ridge being equal to or less than the height of an inlet ridge of the second locking recess. Claim

11 is clearly allowable in view of its dependency from Claim 13 as well as by virtue of the inclusion of patentable subject matter.

Claim 12 the tongue includes a vertical locking surface having a length and the groove includes a vertical locking surface having a length, the vertical locking surface of the tongue being less than the length of the vertical locking surface of the groove. Claim 12 is clearly allowable in view of its dependency from Claim 1 as well as by virtue of the inclusion of patentable subject matter.

Claim 13 provides a minimum thickness between the first locking recess and a bottom plane of the floor panel exceeds a third of the total height of the floor panel. Thiers does not disclose a first locking recess. Claim 13 is clearly allowable.

Claim 14 specifies that the groove includes an introduction angle, the introduction angle of the groove being equal to or greater than 10 degrees. Claim 14 is clearly allowable in view of its dependency from Claim 1 as well as by virtue of the inclusion of patentable subject matter.

Claim 15 provides that the length of the internally extending portion within the groove is less than the length of the lip portion protruding from an entrance opening of the groove. Claim 15 is clearly allowable in view of its dependency from Claim 1 as well as by virtue of the inclusion of patentable subject matter.

CONCLUSION

In view of the foregoing, it is submitted that all claims remaining in the application are clearly allowable.

I4F Exhibit 1003 - 103

WHEREFORE, favorable reconsideration and early allowance are respectfully solicited

It is believed that no fees are required by the instant submission. However, the Commissioner is authorized to charge any fees incurred or credit any overpayment to Deposit Account No. 50-0320.

Examiner Nguyen is encouraged to telephone the undersigned to discuss any matter that would expedite allowance of the present application.

Respectfully submitted,

HAUG PARTNERS LLP
Attorneys for Applicant

Date: February 7, 2022

By: /Seth Natter/
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Electronic Acknowledgement Receipt

EFS ID:	44930591
Application Number:	17052836
International Application Number:	
Confirmation Number:	7468
Title of Invention:	JOINING SYSTEM FOR FLOOR PANELS
First Named Inventor/Applicant Name:	Bobby Markovski
Customer Number:	20999
Filer:	SETH NATTER
Filer Authorized By:	
Attorney Docket Number:	A676-3
Receipt Date:	07-FEB-2022
Filing Date:	04-NOV-2020
Time Stamp:	13:21:44
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	sb0021transmittal.pdf	242942 37a2604767486f1aec6ff75a43d280e514b04025	no	2

Warnings:

Information:					
2	Amendment/Req. Reconsideration-After Non-Final Reject	ptoamendment.pdf	44811 103df7f7061a8aff0539ad9ba946a4a7d5240067	no	1
Warnings:					
Information:					
3	Claims	pto_claims.pdf	1697362 00a3e7f46e37a828e8657f8a022a7496318bd48b	no	4
Warnings:					
Information:					
4	Applicant Arguments/Remarks Made in an Amendment	ptoremarks.pdf	1702091 ca4944a8feb2ab35b609381ddcad516395ebab49	no	6
Warnings:					
Information:					
		Total Files Size (in bytes):	3687206		

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.

Doc Code: TRAN.LET

Document Description: Transmittal Letter

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Approved for use through 11/30/2020. OMB 0651-0031
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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

Application Number	17052836
Filing Date	11-04-2020
First Named Inventor	Markovski
Art Unit	3635
Examiner Name	Nguyen
Attorney Docket Number	A676-3

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☑ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☐ Other Enclosure(s) (please Identify below):

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Hayg Partners LLP		
Signature	/Seth Natter/		
Printed name	Seth Natter		
Date	07-FEB-2022	Reg. No.	25122

CERTIFICATE OF TRANSMISSION/MAILING

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

Signature			
Typed or printed name		Date	

This collection of information is required by 37 CFR 1.5. 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 and1.14. This collection is estimated to 2 hours 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.

Privacy Act Statement

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

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

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

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/052,836	11/04/2020	Bobby Markovski	A676-3	7468

20999 7590 12/07/2021

HAUG PARTNERS LLP
745 FIFTH AVENUE - 10th FLOOR
NEW YORK, NY 10151

EXAMINER	
NGUYEN, CHI Q	

ART UNIT	PAPER NUMBER
3635	

NOTIFICATION DATE	DELIVERY MODE
12/07/2021	ELECTRONIC

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

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

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

docket@haugpartners.com

Office Action Summary	Application No. 17/052,836	Applicant(s) Markovski et al.	
	Examiner CHI Q NGUYEN	Art Unit 3635	AIA (FITF) Status Yes

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

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

Status

1)☑ Responsive to communication(s) filed on 11/4/2020.

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

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-15 is/are pending in the application.

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

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-15 is/are rejected.

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

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

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

Application Papers

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

11)☑ The drawing(s) filed on 11/4/2020 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

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

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

Priority under 35 U.S.C. § 119

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

Certified copies:

a)☑ All b)☐ Some** c)☐ None of the:

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

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

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

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

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date 11/4/2020.

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

4) ☐ Other: _____.

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.

This non-final Office action is in response to Applicant's patent application number 17/052,836 filed on 11/4/2020.

Priority

Receipt is acknowledged of certified copies of papers required by 37 CFR 1.55.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 11/4/2020 is being considered by the examiner.

Specification

This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required without any other texts.

Claim Objections

Claim 13 is objected to because of the following informalities: line 3; the Applicant is advised to take out an extra "of the", should be read as -- of the floor panel -- instead of "of the of the floor panel". Appropriate correction is required.

Claim Interpretation

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

> (f) Element in Claim for a Combination. – An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

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

> An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim

> shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

This application includes one or more claim limitations that use the word "means" or "step" but are nonetheless not being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph because the claim limitation(s) recite(s) sufficient structure, materials, or acts to entirely perform the recited function. Such claim limitation(s) is/are: "means of integrated locking means" or "locking means" in claim 1.

Because this/these claim limitation(s) is/are **not** being interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, it/they is/are **not** being interpreted to cover only the corresponding structure, material, or acts described in the specification as performing the claimed function, and equivalents thereof.

If applicant intends to have this/these limitation(s) interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, applicant may: (1) amend the claim limitation(s) to remove the structure, materials, or acts that performs the claimed function; or (2) present a sufficient showing that the claim limitation(s) does/do not recite sufficient structure, materials, or acts to perform the claimed function.

Claim Rejections - 35 USC § 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.

Claims 1-15 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the

inventor or a joint inventor (or for applications subject to pre-AIA 35 U.S.C. 112, the applicant), regards as the invention.

Re claim 1, line 5; a citation “a tongue” is confusing and indefinite because it is not clear that if this “a tongue” is the same “a tongue” already cited in line 4? It should be cited as “the tongue”. Correction is required. Claims 2-15 depending upon the rejected claim 1 are also rejected.

Re claim 1, line 6; a citation “means of integrated locking means” is confusing and indefinite because it is unclear with a double “means”? Clarification is required. Claims 2-15 depending upon the rejected claim 1 are also rejected.

Re claim 1, lines 12, 14, 19 and 20; a phrase “which” is confusing and indefinite because it is not clear that if “which” referring to which structure? Clarification is required. Claims 2-15 depending upon the rejected claim 1 are rejected.

Re claim 7, line 2; a citation “the depth” does not have a proper antecedent basis. Correction is required.

Re claim 11, line 2; a citation “the height” does not have a proper antecedent basis. Correction is required.

Re claim 12, line 2; a citation “the length” does not have a proper antecedent basis. Correction is required.

Re claim 13, line 2; a citation “the minimum thickness” does not have a proper antecedent basis. Correction is required.

Re claim 14, line 2; a citation “the introduction angle” does not have a proper antecedent basis. Correction is required.

Claim Rejections - 35 USC § 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.

As best understood, claim(s) 1-15 is/are rejected under 35 U.S.C. 102(a)(1) as being anticipated by US No. 2002/0020127 to Thiers et al. ('Thiers').

Re claim 1: Thiers discloses a joining system for floor panels (1) comprising coupling parts (7) provided on at least two opposite sides (Figs. 22-23) of said floor panels for joining floor panels (1) together, said coupling parts (7) including a groove (9) and a tongue (8), where the groove (9) is shaped for insertion of the tongue (8) on an adjoining floor panel (2), said tongue (8) being shaped for locking engagement by means of integrated locking means (wherein near 8 and 47, Fig. 23) with the groove (9) in a direction perpendicular to said sides and parallel to a horizontal floor plane defined by the joined panels (1), said coupling parts (7) exerting a tension force towards each other in a mutually engaged position, the tension force being achieved by elastic compression (e.g. as shown in Fig. 23) of the material of the coupling parts (7), wherein the locking means comprises dual consecutive locking recesses (13, and near 9) arranged in a lower portion (11) of the groove (9), a first locking recess (near 9) of which being located in an internally extending portion within the groove (9) and a second locking recess (wherein near 47 points to) of which being located in a lip portion (wherein 11 points to) protruding from an entrance opening (49, Fig. 21) of the groove (9), the locking means (7) further comprises dual consecutive locking lugs (near 8, 47) arranged in a lower portion of the tongue (8) for horizontally interlocking engagement with said dual consecutive locking recesses in the groove (9), a first locking lug (near wherein 8 points to, Fig. 21) of which extending downwardly from a lower tip portion of the tongue (8) and a second locking lug (47) of which extends downwardly from a root portion of the tongue (8), wherein the first locking recess and the first locking lug are provided with

matching curved horizontal locking surfaces and the second locking recess and the second locking lug are provided with matching inclined horizontal locking surfaces (see Figs. 21-23).

Re claims 2-3: wherein an intermediate transitional ridge (e.g. a portion between 8/49) between the first locking lug and the second locking lug is located inside/aligned with/of the entrance opening (49) of groove (9), said entrance opening (49) being located in a main vertical joint plane between two joined floor panels (Fig. 23).

Re claim 4: wherein the lower tip portion (near 8) of the tongue (8) is curved.

Re claim 5: wherein the curvature of the curved lower tip portion of the tongue (8) merges continuously with a corresponding curvature of the horizontal locking surface (wherein 8 points to, Fig. 21) of the first locking lug.

Re claim 6: wherein the first locking recess (near 9) is shallower than the second locking recess (near 47, Fig. 21).

Re claim 7: wherein the depth of the first locking recess is less than half of the depth of the second locking recess (as shown in Fig. 21).

Re claims 8-9: wherein an exit tangent inclination angle of the curved horizontal locking surface of the first locking recess (near 8) is less than half the inclined locking angle of the second locking recess (near 13, Fig. 21).

Re claim 10: wherein the curved horizontal locking surface (near 8) extends from a point located essentially directly below a radial center of the curved first locking recess in a direction towards the second locking recess (near 47).

Re claim 11: the height (near 44) of the intermediate transitional ridge measured from a bottom plane of the floor panel (1) is equal to or less than the corresponding height (near 46) of a corresponding inlet ridge of the second locking recess (see Fig. 19).

Re claim 12: the length (near 3, Fig. 22) of a vertical locking surface of the tongue (8) is less than the corresponding length of a matching vertical locking surface of the groove (9, see Figs. 22-23).

Re claim 13. Wherein the minimum thickness between the first locking recess (near 9) and a bottom plane of the floor panel (1) exceeds a third of the total height (H) of the floor panel (1).

Re claim 14: wherein the introduction angle (e.g. a chamfer portion near 12) of the groove (9) is equal to or greater than 10 degrees.

Re claim 15: wherein the length (e.g. a portion near 4 points to, Fig. 21) of the internally extending portion within the groove (9) is less than the length (e.g. a portion from 12-11, Fig. 21)) of the lip portion protruding from an entrance opening of the groove (9).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure (see attached PTO-892).

Contact Information

Any inquiry concerning this communication or earlier communication from the examiner should be directed to CHI Q. NGUYEN whose telephone number is (571) 272- 6847. The examiner can normally be reached on Monday-Friday from 7:30 am-4:00 pm. If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Mattei can be reached at (571) 270-3238. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pairdirect.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at (866) 217-9197.

/CHI Q NGUYEN/

Primary Examiner, Art Unit 3635



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	Examiner CHI Q NGUYEN	Art Unit 3635	Page 1 of 1

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Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/052,836	Markovski et al.
	Examiner	Art Unit
	CHI Q NGUYEN	3635

CPC - Searched*		
Symbol	Date	Examiner
(e04f15/02033 OR e04f15/02038 OR e04f15/107 OR e04f15/102 OR e04f2201/042 OR e04f2201/0107 OR e04f2201/03 OR e04f15/02038 OR e04f2201/0552 OR e04f2201/023 OR e04f2201/0535 OR e04f2201/0146 OR e04f2201/043 OR e04f2201/0547 OR e04f2201/0153 OR e04f2201/0138 OR e04f2201/042).cpc.	12/02/2021	CN

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner
52	592.1, 592.3,592.2,578,588.1,309.1,309.3	12/02/2021	CN

* 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
PALM inventor name; BRS and related arts FW/BW search	12/02/2021	CN

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

/CHI Q NGUYEN/ Primary Examiner, Art Unit 3635	

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PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L3	36135	(e04f15/02033 OR e04f15/02038 OR e04f15/107 OR e04f15/102 OR e04f2201/042 OR e04f2201/0107 OR e04f2201/03 OR e04f15/02038 OR e04f2201/0552 OR e04f2201/023 OR e04f2201/0535 OR e04f2201/0146 OR e04f2201/043 OR e04f2201/0547 OR e04f2201/0153 OR e04f2201/0138 OR e04f2201/042).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/01 01:26 PM
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PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

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(Use as many sheets as necessary)

Sheet 1 of 1

Complete if known	
Int'l Application Number	PCT/EP2019/061431
Int'l Filing Date	May 3, 2019
First Named Inventor	Bobby Markovski et al.
Art Unit	To Be Assigned
Examiner Name	~~To Be Assigned~~ Nguyen
Attorney Docket Number	A676-3

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Examiner Initials*	Cite No.[1]	Document Number: Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document
	1.			
	2.			
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	4.			
	5.			

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Examiner Initials*	Cite No.[1]	Foreign Patent Document: Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Translation[6]
	6.	DE 20 2007 013059 U1	11-15-2007	Flooring Industries Ltd.	X
	7.	WO 2017/068523 A1	04-27-2017	Flooring Industries Limited SARL	
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	9.				
	10.				

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
	11.	International Search Report and Written Opinion mailed on June 27, 2019 in corresponding International Application No. PCT/EP2019/061431.
	12.	
	13.	

Examiner Signature	/CHI Q NGUYEN/	Date Considered	12/02/2021

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
17/052,836	11/04/2020	Bobby Markovski	A676-3

CONFIRMATION NO. 7468

20999
HAUG PARTNERS LLP
745 FIFTH AVENUE - 10th FLOOR
NEW YORK, NY 10151

PUBLICATION NOTICE



Title:JOINING SYSTEM FOR FLOOR PANELS

Publication No.US-2021-0262242-A1
Publication Date:08/26/2021

NOTICE OF PUBLICATION OF APPLICATION

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

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

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

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

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

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

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
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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
17/052,836	11/04/2020	3633	910	A676-3	15	1

CONFIRMATION NO. 7468

CORRECTED FILING RECEIPT

20999
HAUG PARTNERS LLP
745 FIFTH AVENUE - 10th FLOOR
NEW YORK, NY 10151

OC000000128380978

Date Mailed: 06/29/2021

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

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Inventor(s)

Bobby Markovski, Helsingborg, SWEDEN;
Bengt Rosander, Deceased, SWEDEN;
Magnus Persson, Helsingborg, SWEDEN;

Applicant(s)

VILOX AB, Helsingborg, SWEDEN;

Assignment For Published Patent Application

VILOX AB, Helsingborg, SWEDEN

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/EP2019/061431 05/03/2019

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
SWEDEN 1830152-3 05/04/2018

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

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

If Required, Foreign Filing License Granted: 04/28/2021

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 17/052,836**

Projected Publication Date: 08/26/2021

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
Title

JOINING SYSTEM FOR FLOOR PANELS

Preliminary Class

052

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

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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 AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

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technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

I4F Exhibit 1003 - 132

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First-named inventor: Bobby Markovski et al.

Application No. : 17/052,836 **Filed :** November 4, 2020

Title : *Joining System for Floor Panels*

Examiner To Be Assigned

Art Unit : 3633 **Confirmation No.** : 7468

REQUEST FOR CORRECTED FILING RECEIPT
AND
NOTICE OF ACCEPTANCE OF APPLICATION

FILED VIA EFS-Web
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is a Request to correct the Filing Receipt and the Notice of Acceptance of Application issued in the above-identified application.

Under Foreign Application(s):

Please correct the priority date of the Sweden foreign application number 1830152-3 from "April 5, 2018" to --May 4, 2018--.

Submitted concurrently herewith is a copy of the Filing Receipt and the Notice of Acceptance of Application with the requested correction noted thereon, for the above-referenced application. The issuance of a corrected Filing Receipt and the Notice of Acceptance of Application is respectfully requested.

The error appears to be a mistake made by the U.S. Patent Office, as evidenced by the Application Data Sheet filed on November 4, 2020.

No fee is believed due for submission of the Request for Correction.

I4F Exhibit 1003 - 133

General Authorization: The Commissioner is authorized and requested to charge any fee deficiencies, and credit any overpayment, during the entire pendency of this application to Deposit Account 50-0320.

Respectfully submitted,

HAUG PARTNERS LLP
Attorneys for Applicant

Date: May 14, 2021 By: /David V. Rossi/
David V. Rossi
Reg. No. 36,659

Customer No.: 20999
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745 Fifth Avenue
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UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
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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
17/052,836	11/04/2020		910	A676-3	15	1

CONFIRMATION NO. 7468

20999
HAUG PARTNERS LLP
745 FIFTH AVENUE - 10th FLOOR
NEW YORK, NY 10151

FILING RECEIPT

OC000000125246568

Date Mailed: 04/30/2021

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Magnus Persson, Helsingborg, SWEDEN;

Applicant(s)

VILOX AB, Helsingborg, SWEDEN;

Assignment For Published Patent Application

VILOX AB, Helsingborg, SWEDEN

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/EP2019/061431 05/03/2019

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SWEDEN 1830152-3 ~~04/05/2018~~
05/04/2018

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Projected Publication Date: 08/05/2021

Non-Publication Request: No

Early Publication Request: No
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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 AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

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United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
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U.S. APPLICATION NO.	FIRST NAMED INVENTOR	ATTY. DOCKET NO.
17/052,836	Bobby Markovski	A676-3

20999
HAUG PARTNERS LLP
745 FIFTH AVENUE - 10th FLOOR
NEW YORK, NY 10151

INTERNATIONAL APPLICATION NO.		
PCT/EP2019/061431		
I.A. FILING DATE	PRIORITY DATE	
05/03/2019	~~04/05/2018~~	05/04/2018

CONFIRMATION NO. 7468
371 ACCEPTANCE LETTER

OC00000125246567

Date Mailed: 04/30/2021

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

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

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

11/04/2020
DATE OF RECEIPT OF 35 U.S.C.
371(c)(1) and (c)(2) REQUIREMENTS

The following items have been received:

- Indication of Small Entity Status
- Copy of the International Application filed on 11/04/2020
- Copy of the International Search Report filed on 11/04/2020
- Preliminary Amendments filed on 11/04/2020
- Information Disclosure Statements filed on 11/04/2020
- Inventor's Oath or Declaration filed on 11/12/2020
- Request for Immediate Examination filed on 11/04/2020
- U.S. Basic National Fees filed on 11/04/2020
- Assignee Statement for PGPUB filed on 11/04/2020
- Authorize Access to Search Results filed on 11/04/2020
- Priority Documents filed on 11/04/2020
- Authorization to Permit Access filed on 11/04/2020
- Application Data Sheet (37 CFR 1.76) filed on 11/04/2020

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

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

CELESTINE K MILLER-DUCKETT

Telephone: (703) 756-1033

I4F Exhibit 1003 - 140

Electronic Acknowledgement Receipt

EFS ID:	42729769
Application Number:	17052836
International Application Number:	
Confirmation Number:	7468
Title of Invention:	JOINING SYSTEM FOR FLOOR PANELS
First Named Inventor/Applicant Name:	Bobby Markovski
Customer Number:	20999
Filer:	David V. Rossi/Shabana Alli-Arjune
Filer Authorized By:	David V. Rossi
Attorney Docket Number:	A676-3
Receipt Date:	14-MAY-2021
Filing Date:	04-NOV-2020
Time Stamp:	17:12:36
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Corrected Filing Receipt	REQFRNO.pdf	1110891 2f5824abc5bb0106b3ac202af065334048ec59ad	no	8

Warnings:

Information:	
Total Files Size (in bytes):	1110891

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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.

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Assignment For Published Patent Application

VILOX AB, Helsingborg, SWEDEN

Power of Attorney: None

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SWEDEN 1830152-3 04/05/2018

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Projected Publication Date: 08/05/2021

Non-Publication Request: No

Early Publication Request: No
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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

GRANTED

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

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

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

NOT GRANTED

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

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

I4F Exhibit 1003 - 146

MULTIPLE DEPENDENT CLAIM FEE CALCULATION SHEET

Substitute for Form PTO-1360
(For use with Form PTO/SB/06)

Application Number	Filing Date
17052836	

Applicant(s) Bobby Markovski

* May be used for additional claims or amendments

CLAIMS	AS FILED		AFTER FIRST AMENDMENT		AFTER SECOND AMENDMENT	
	Indep	Depend	Indep	Depend	Indep	Depend
1	1		1			
2		1		1		
3		1		1		
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5		3		1		
6		(1)		1		
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Total Indep	1		1		0	
Total Depend	18	↵	14	↵	0	↵
Total Claims	19		15		0	

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 17/052,836

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	160		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	270		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	400		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	15 minus 20 =	*	x 50 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*	x 240 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	830		TOTAL	

APPLICATION AS AMENDED - PART II

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

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

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

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

U.S. APPLICATION NO.	FIRST NAMED INVENTOR	ATTY. DOCKET NO.
17/052,836	Bobby Markovski	A676-3

20999
HAUG PARTNERS LLP
745 FIFTH AVENUE - 10th FLOOR
NEW YORK, NY 10151

INTERNATIONAL APPLICATION NO.	
PCT/EP2019/061431	
I.A. FILING DATE	PRIORITY DATE
05/03/2019	04/05/2018

CONFIRMATION NO. 7468
371 ACCEPTANCE LETTER

OC00000125246567

Date Mailed: 04/30/2021

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

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

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

11/04/2020
DATE OF RECEIPT OF 35 U.S.C.
371(c)(1) and (c)(2) REQUIREMENTS

The following items have been received:

- Indication of Small Entity Status
- Copy of the International Application filed on 11/04/2020
- Copy of the International Search Report filed on 11/04/2020
- Preliminary Amendments filed on 11/04/2020
- Information Disclosure Statements filed on 11/04/2020
- Inventor's Oath or Declaration filed on 11/12/2020
- Request for Immediate Examination filed on 11/04/2020
- U.S. Basic National Fees filed on 11/04/2020
- Assignee Statement for PGPUB filed on 11/04/2020
- Authorize Access to Search Results filed on 11/04/2020
- Priority Documents filed on 11/04/2020
- Authorization to Permit Access filed on 11/04/2020
- Application Data Sheet (37 CFR 1.76) filed on 11/04/2020

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

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

CELESTINE K MILLER-DUCKETT

Telephone: (703) 756-1033

I4F Exhibit 1003 - 150

PATENT
Attorney Docket No.: A676-3

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Bobby Markovski et al.

Application No.: 17/052,836 Confirmation No.: 7468

Filed: November 4, 2020 Art Unit: To Be Assigned

For: JOINING SYSTEM FOR FLOOR PANELS Examiner: To Be Assigned

VIA EFS WEB

FILING OF THE EXECUTED DECLARATIONS AND THE SUBSTITUTE STATEMENT IN LIEU OF AN OATH OR DECLARATION

Sir:

Applicant respectfully submits the Declarations duly executed by inventors, Bobby Markovski and Magnus Persson. Applicant also submits the Substitute Statement in Lieu of an Oath or Declaration on behalf of inventor, Bengt Rosander which was executed by the CEO of the Applicant, VILOX AB, for the above-referenced application.

No fee is believed to be due for submission of the executed Declarations and the Substitute Statement in Lieu of an Oath or Declaration, as the surcharge set forth in 37 CFR § 1.16(f) was charged to our credit card on November 4, 2020.

General Authorization: The Commissioner is authorized and requested to charge any fee deficiencies, and credit any overpayment, during the entire pendency of this application to Deposit Account 50-0320.

Respectfully submitted,

HAUG PARTNERS LLP
Attorneys for Applicant

Date: November 12, 2020 By: /David V. Rossi/
David V. Rossi
Reg. No. 36,659

Customer No.: 20999
Haug Partners LLP
745 Fifth Avenue
New York, NY 10151

PTO/AIA/01 (06-12)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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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	JOINING SYSTEM FOR FLOOR PANELS

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 17/052,836

filed on November 4, 2020.

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

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

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

WARNING:

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

LEGAL NAME OF INVENTOR

Inventor: Bobby Markovski Date (Optional): _____

Signature: _____

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.**

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

Privacy Act Statement

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

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

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

PTO/AIA/01 (06-12)
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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	JOINING SYSTEM FOR FLOOR PANELS

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 17/052,836

filed on November 4, 2020

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:

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LEGAL NAME OF INVENTOR

Inventor: Magnus Persson Date (Optional): 2

Signature:

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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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.

Doc code: Oath
Document Description: Oath or declaration filed

PTO/AIA/02 (07-13)
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SUBSTITUTE STATEMENT IN LIEU OF AN OATH OR DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (35 U.S.C. 115(d) AND 37 CFR 1.64)

Title of Invention	JOINING SYSTEM FOR FLOOR PANELS

This statement is directed to:

☐ The attached application,

OR

☒ United States application or PCT international application number 17/052,836 filed on November 4, 2020.

LEGAL NAME of inventor to whom this substitute statement applies:

(*E.g.*, Given Name (first and middle (if any)) and Family Name or Surname)

Bengt Rosander

Residence (except for a deceased or legally incapacitated inventor):

City	State	Country

Mailing Address (except for a deceased or legally incapacitated inventor):

City	State	Zip	Country

I believe the above-named inventor or joint inventor to be the original inventor or an original joint inventor of a claimed invention in the application.

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

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

Relationship to the inventor to whom this substitute statement applies:

☐ Legal Representative (for deceased or legally incapacitated inventor only),

☒ Assignee,

☐ Person to whom the inventor is under an obligation to assign,

☐ Person who otherwise shows a sufficient proprietary interest in the matter (petition under 37 CFR 1.46 is required), or

☐ Joint Inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

PTO/SB/AIA02 (07-13)
Approved for use through 11/30/2020. OMB 0651-0032
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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.

SUBSTITUTE STATEMENT

Circumstances permitting execution of this substitute statement:

- [x] Inventor is deceased,
- [ ] Inventor is under legal incapacity,
- [ ] Inventor cannot be found or reached after diligent effort, or
- [ ] Inventor has refused to execute the oath or declaration under 37 CFR 1.63.

If there are joint inventors, please check the appropriate box below:

- [x] An application data sheet under 37 CFR 1.76 (PTO/AIA/14 or equivalent) naming the entire inventive entity has been or is currently submitted.

OR

- [ ] An application data sheet under 37 CFR 1.76 (PTO/AIA/14 or equivalent) has not been submitted. Thus, a Substitute Statement Supplemental Sheet (PTO/AIA/11 or equivalent) naming the entire inventive entity and providing inventor information is attached. See 37 CFR 1.64(b).

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.

PERSON EXECUTING THIS SUBSTITUTE STATEMENT:

Name: Bobby Markovski, CEO	Date (Optional):

Signature:

APPLICANT NAME AND TITLE OF PERSON EXECUTING THIS SUBSTITUTE STATEMENT:

If the applicant is a juristic entity, list the applicant name and the title of the signer:

Applicant Name: VILOX AB

Title of Person Executing This Substitute Statement:

The signer, whose title is supplied above, is authorized to act on behalf of the applicant.

Residence of the signer (unless provided in an application data sheet, PTO/AIA/14 or equivalent):

City	State	Country

Mailing Address of the signer (unless provided in an application data sheet, PTO/AIA/14 or equivalent)

City	State	Zip	Country

Note: Use an additional PTO/AIA/02 form for each inventor who is deceased, legally incapacitated, cannot be found or reached after diligent effort, or has refused to execute the oath or declaration under 37 CFR 1.63.

Privacy Act Statement

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

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

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

Electronic Acknowledgement Receipt

EFS ID:	41109849
Application Number:	17052836
International Application Number:	
Confirmation Number:	7468
Title of Invention:	JOINING SYSTEM FOR FLOOR PANELS
First Named Inventor/Applicant Name:	Bobby Markovski
Customer Number:	20999
Filer:	David V. Rossi/Shabana Alli-Arjune
Filer Authorized By:	David V. Rossi
Attorney Docket Number:	A676-3
Receipt Date:	12-NOV-2020
Filing Date:	
Time Stamp:	16:43:24
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	02033654.PDF	118252 9b0f76b6aae86d623a3d876f5702f495d18d6a5a	no	1

Warnings:

Information:					
2	Oath or Declaration filed	02033655.PDF	1318959 8ef3710dad385cbeea16666daf2d0758c6072a01	no	2
Warnings:					
Information:					
3	Oath or Declaration filed	02033656.PDF	1319701 4371cc3bafac8f9e9369fe3176ebad834d7b39cf	no	2
Warnings:					
Information:					
4	Oath or Declaration filed	02033657.PDF	1946871 c15946425f2d89a0eef9dc38f2d500cebd89c917	no	3
Warnings:					
Information:					
		Total Files Size (in bytes):	4703783		

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.

PCT REQUEST

(Original in Electronic Form)

0	**For receiving Office use only**	
0-1	International Application No.	**PCT/EP2019/061431**
0-2	International Filing Date	**03 MAY 2019 (03.05.2019)**
0-3	Name of receiving Office and "PCT International Application"	**RO/EP**

0-4	**Form PCT/RO/101 PCT Request**	
0-4-1	Prepared Using	PCT Online Filing Version 3.51.000.262e MT/FOP 20141031/0.20.5.20
0-5	**Petition**	
	The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty	
0-6	**Receiving Office (specified by the applicant)**	European Patent Office (EPO) (RO/EP)
0-7	**Applicant's or agent's file reference**	W121690005W2
I	**Title of Invention**	JOINING SYSTEM FOR FLOOR PANELS
II	**Applicant**	
II-1	This person is	Applicant only Legal-heirs of ROSANDER Bengt (deceased)
II-2	Applicant for	All designated States
II-4	Name	Ipendor AB
II-5	Address	Mangårdsgatan 57 256 67 HELSINGBORG Sweden
II-6	State of nationality	SE
II-7	State of residence	SE
III-1	**Applicant and/or inventor**	
III-1-1	This person is	Inventor only
III-1-3	Inventor for	All designated States
III-1-4	Name (LAST, First)	MARKOVSKI, Bobby
III-1-5	Address	Harvgatan 2 254 48 HELSINGBORG Sweden
III-2	**Applicant and/or inventor**	
III-2-1	This person is	Inventor only (deceased)
III-2-4	Name (LAST, First)	ROSANDER, Bengt

PCT REQUEST

(Original in Electronic Form)

III-3	**Applicant and/or inventor**	
III-3-1	This person is	Inventor only
III-3-3	Inventor for	All designated States
III-3-4	Name (LAST, First)	PERSSON, Magnus
III-3-5	Address	Handelsmansgatan 1a 252 49 Helsingborg Sweden
IV-1	**Agent or common representative; or address for correspondence**	
	The person identified below is hereby/ has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:	Agent
IV-1-1	Name	Ström & Gulliksson AB
IV-1-2	Address	P.O. Box 793 220 07 LUND Sweden
IV-1-3	Telephone No.	+46 46 190500
IV-1-4	Facsimile No.	+46 46 190510
IV-1-5	e-mail	mail@sg.se
V	**DESIGNATIONS**	
V-1	**The filing of this request constitutes under Rule 4.9(a), the designation of all Contracting States bound by the PCT on the international filing date, for the grant of every kind of protection available and, where applicable, for the grant of both regional and national patents.**	
VI-1	**Priority claim of earlier national application**	
VI-1-1	Filing date	04 May 2018 (04.05.2018)
VI-1-2	Number	1830152-3
VI-1-3	Country or Member of WTO	SE
VI-2	**Incorporation by reference :**	
	where an element of the international application referred to in Article 11(1)(iii)(d) or (e) or a part of the description, claims or drawings referred to in Rule 20.5(a) is not otherwise contained in this international application but is completely contained in an earlier application whose priority is claimed on the date on which one or more elements referred to in Article 11(1)(iii) were first received by the receiving Office, that element or part is, subject to confirmation under Rule 20.6, incorporated by reference in this international application for the purposes of Rule 20.6.	
VII-1	**International Searching Authority Chosen**	European Patent Office (EPO) (ISA/EP)
VII-2	**Request to use results of earlier search; reference to that search**	
VII-2-1	Filing date	04 May 2018 (04.05.2018)
VII-2-2	Application Number	1830152-3
VII-2-3	Country (or regional Office)	SE
VII-2-4	Statement (Rule 4.12(ii)):	This international application is the same, or substantially the same, as the application in respect of which the earlier search was carried out except, where applicable, that it is filed in a different language.

PCT REQUEST

(Original in Electronic Form)

VIII	**Declarations**	Number of declarations	
VIII-1	Declaration as to the identity of the inventor	–	
VIII-2	Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent	–	
VIII-3	Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application	–	
VIII-4	Declaration of inventorship (only for the purposes of the designation of the United States of America)	–	
VIII-5	Declaration as to non-prejudicial disclosures or exceptions to lack of novelty	–	
IX	**Check list**	Number of sheets	Electronic file(s) attached
IX-1	Request (including declaration sheets)	4	✓
IX-2	Description	14	✓
IX-3	Claims	3	✓
IX-4	Abstract	1	✓
IX-5	Drawings	4	✓
IX-7	TOTAL	26	
	Accompanying Items	Paper document(s) attached	Electronic file(s) attached
IX-8	Fee calculation sheet	–	✓
IX-19	Other	Pre-conversion archive Statement (Section 706): This is a complete and accurate copy of the international application prior to its conversion into the electronic document format in which it is filed.	✓
IX-20	**Figure of the drawings which should accompany the abstract**	3	
IX-21	**Language of filing of the international application**	English	
X-1	**Signature of applicant, agent or common representative**	(PKCS7 Digital Signature)	
X-1-1	Name	Ström & Gulliksson AB	
X-1-2	Name of signatory	Maria Weineisen 42686	
X-1-3	Capacity (if such capacity is not obvious from reading the request)	(Representative)	

PCT REQUEST

(Original in Electronic Form)

FOR RECEIVING OFFICE USE ONLY

10-1	**Date of actual receipt of the purported international application**	**03 MAY 2019 (03.05.2019)**
10-2	**Drawings:**	Received
10-2-1	Received	
10-2-2	Not received	
10-3	**Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application**	
10-4	**Date of timely receipt of the required corrections under PCT Article 11(2)**	
10-5	**International Searching Authority**	**ISA/EP**
10-6	**Transmittal of search copy delayed until search fee is paid**	

FOR INTERNATIONAL BUREAU USE ONLY

11-1	**Date of receipt of the record copy by the International Bureau**	

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92*bis*.1 and Administrative Instructions, Section 422)

To:

AWA SWEDEN AB
Matrosgatan 1
211 18 Malmö
SUÈDE

Date of mailing *(day/month/year)*
13 January 2020 (13.01.2020)

Applicant's or agent's file reference
W121690005W2

IMPORTANT NOTIFICATION

International application No.
PCT/EP2019/061431

International filing date *(day/month/year)*
03 May 2019 (03.05.2019)

1. The following indications appeared on record concerning:

☐ the applicant ☐ the inventor ☒ the agent ☐ the common representative

Name and Address

State of Nationality | State of Residence

Telephone No.

Facsimile No.

E-mail address

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☒ the person ☐ the name ☐ the address ☐ the nationality ☐ the residence

Name and Address
AWA SWEDEN AB
Matrosgatan 1
211 18 Malmö
Sweden

State of Nationality | State of Residence

Telephone No.

Facsimile No.

E-mail address
☐ Notifications by e-mail authorized

3. Further observations, if necessary:
The person in box 2 has become the new agent.

4. A copy of this notification has been sent to:

☒ the receiving Office
☒ the International Searching Authority
☐ the Authority(ies) specified for supplementary search
☐ the International Preliminary Examining Authority
☒ the designated Offices concerned
☐ the elected Offices concerned
☐ other:

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer
Nevers Althea
e-mail pct.team5@wipo.int
Telephone No. +41 22 338 74 05

I4F Exhibit 1003 - 165

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92*bis*.1 and Administrative Instructions, Section 422)

To:

AWA SWEDEN AB
Matrosgatan 1
211 18 Malmö
SUÈDE

Date of mailing *(day/month/year)*
09 March 2020 (09.03.2020)

Applicant's or agent's file reference
W121690005W2

IMPORTANT NOTIFICATION

International application No.
PCT/EP2019/061431

International filing date *(day/month/year)*
03 May 2019 (03.05.2019)

1. The following indications appeared on record concerning:

☒ the applicant ☐ the inventor ☐ the agent ☐ the common representative

Name and Address
IPENDOR AB
Mangårdsgatan 57
256 67 HELSINGBORG
Sweden

State of Nationality: SE
State of Residence: SE
Telephone No.
Facsimile No.
E-mail address

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person ☒ the name ☐ the address ☐ the nationality ☐ the residence

Name and Address
VILOX AB
Mangårdsgatan 57
256 67 HELSINGBORG
Sweden

State of Nationality: SE
State of Residence: SE
Telephone No.
Facsimile No.
E-mail address
☐ Notifications by e-mail authorized

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

☒ the receiving Office
☒ the International Searching Authority
☐ the Authority(ies) specified for supplementary search
☐ the International Preliminary Examining Authority
☒ the designated Offices concerned
☐ the elected Offices concerned
☐ other:

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer
Sevillano Carine
e-mail pct.team5@wipo.int
Telephone No. +41 22 338 74 05

Form PCT/IB/306 (January 2009) 1/PZLQP9E4SSJY30

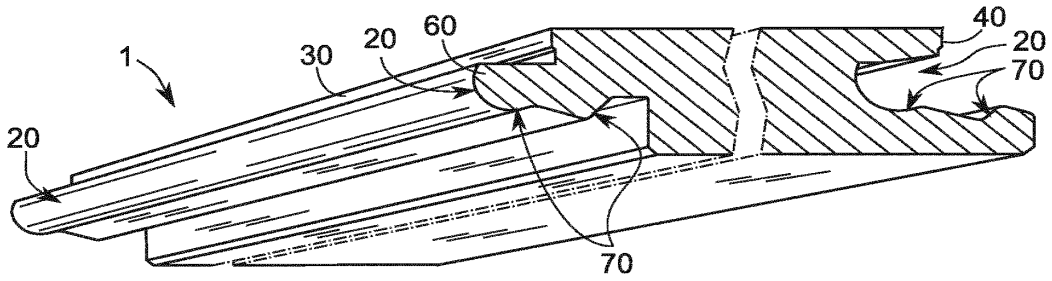


FIG. 1

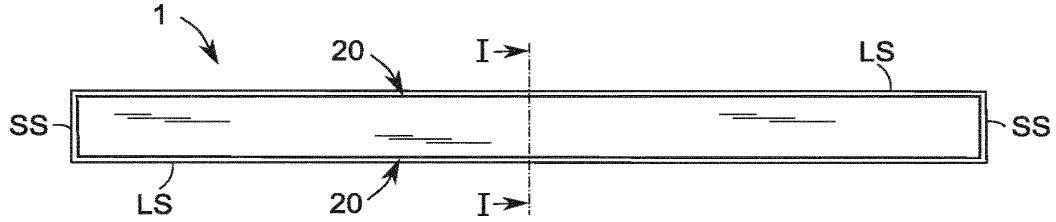


FIG. 2

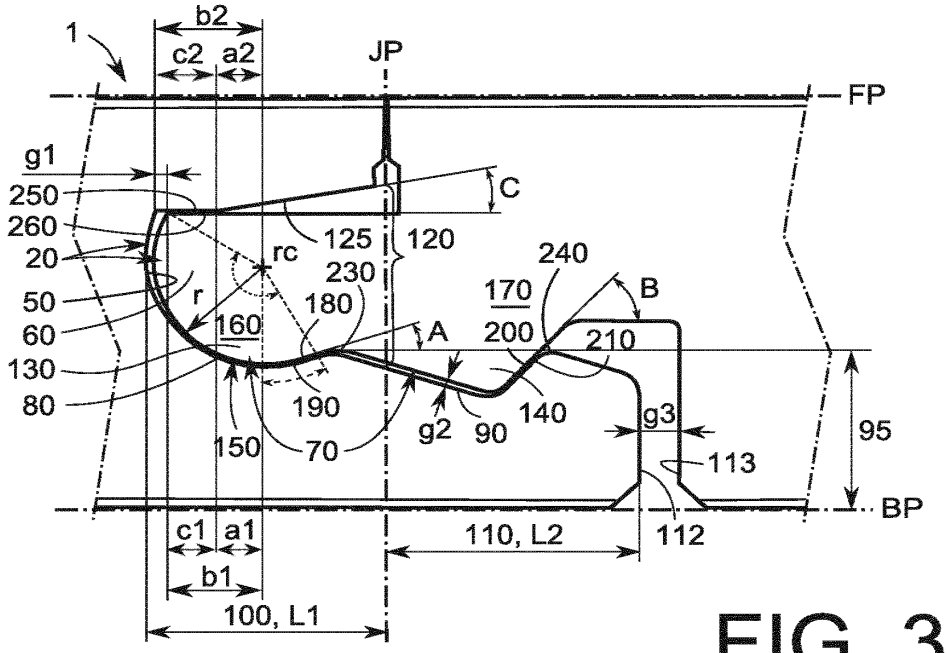


FIG. 3

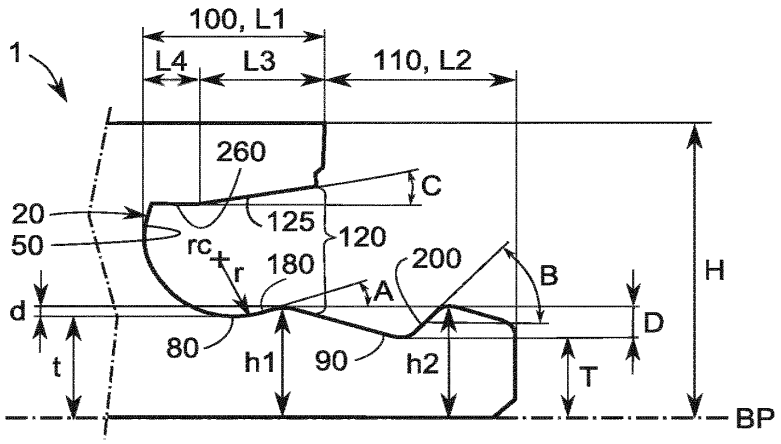

100, L1
L4
L3
110, L2
1
260
C
20
50
125
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rc
r
180
200
B
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h1
90
h2
T
t
BP

FIG. 4

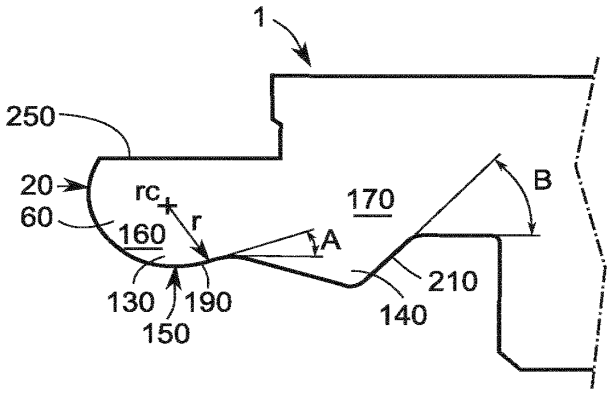

1
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rc
r
160
170
A
B
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140
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FIG. 5

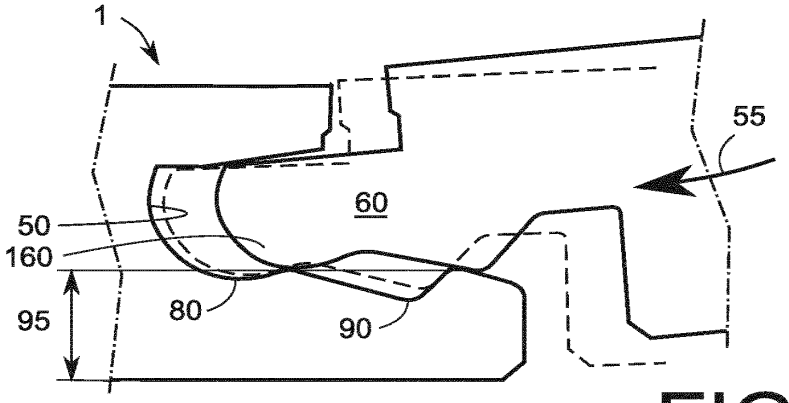


FIG. 6

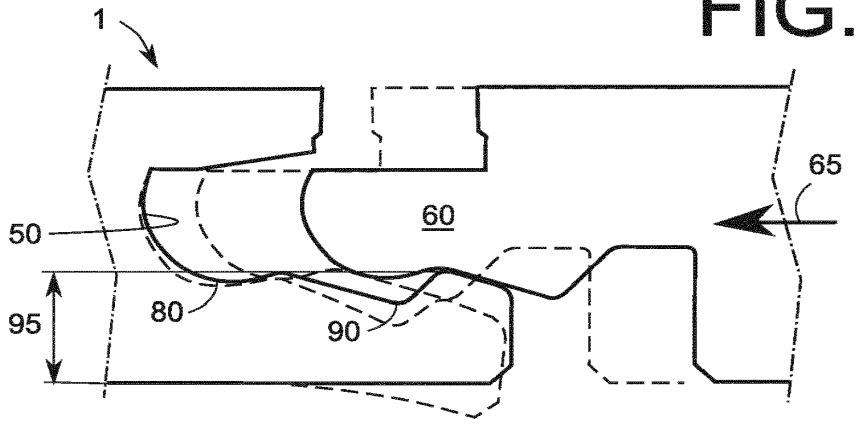


FIG. 7

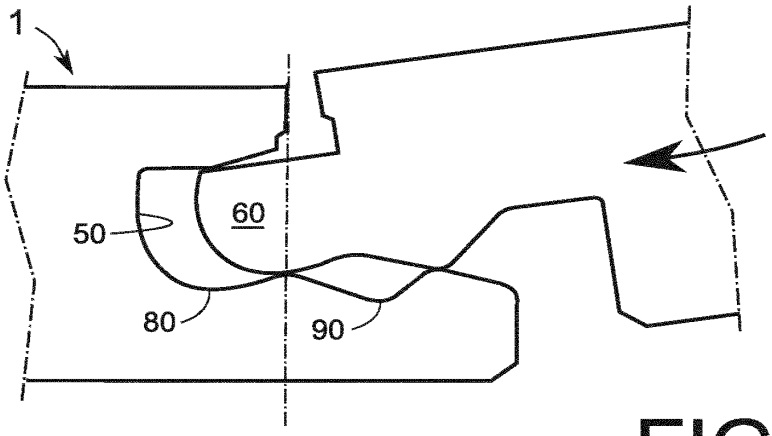


FIG. 8

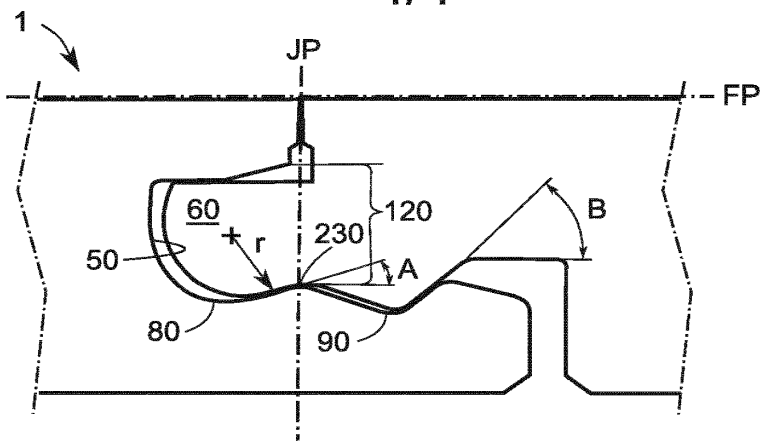


FIG. 9

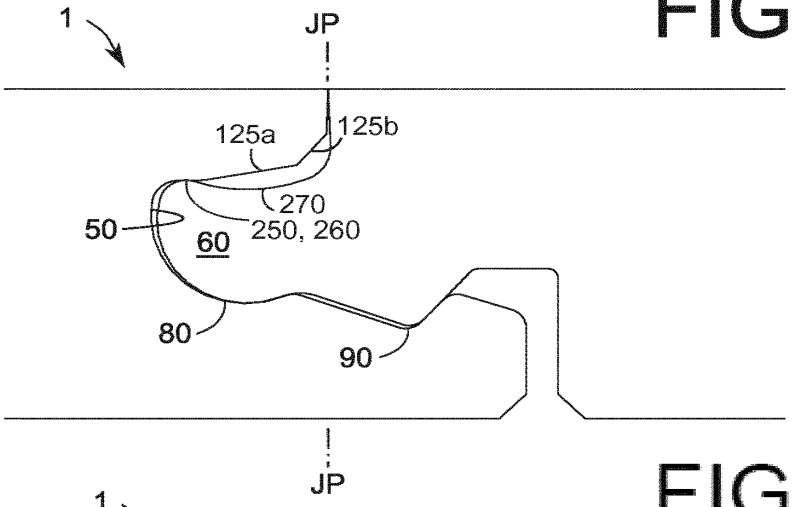


FIG. 10

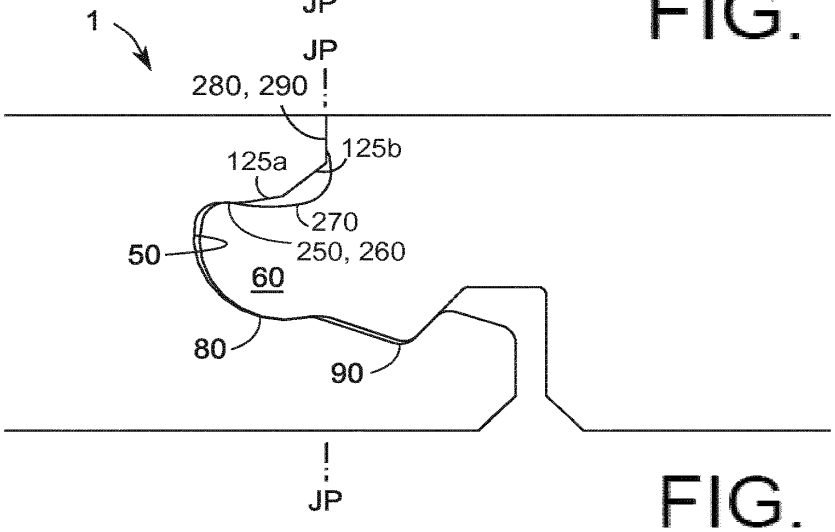


FIG. 11

CLAIMS

1. Joining system for floor panels (1), said floor panels (1) being provided with coupling parts (20) on at least two opposite sides (30, 40) for joining floor panels (1) together, said coupling parts (20) including a groove (50) and a tongue (60), where the groove (50) is shaped for insertion of a tongue (60) on an adjoining floor panel (1), said tongue (60) being shaped for locking engagement by means of integrated locking means (70) with the groove (50) in a direction perpendicular to said sides (30, 40) and parallel to a horizontal floor plane (FP) defined by the joined panels (1), said coupling parts (20) exerting a tension force towards each other in a mutually engaged position, the tension force being achieved by elastic compression of the material of the coupling parts (20), **characterized in** that

- the locking means (70) comprises dual consecutive locking recesses (80, 90) arranged in a lower portion (95) of the groove (50), a first locking recess (80) of which being located in an internally extending portion (100) within the groove (50) and a second locking recess (90) of which being located in a lip portion (110) protruding from an entrance opening (120) of the groove (50),
- the locking means (70) further comprises dual consecutive locking lugs (130, 140) arranged in a lower portion (150) of the tongue (60) for horizontally interlocking engagement with said dual consecutive locking recesses (80, 90) in the groove (50), a first locking lug (130) of which extending downwardly from a lower tip portion (160) of the tongue (60) and a second locking lug (140) of which extending downwardly from a root portion (170) of the tongue (60),
- wherein the first locking recess (80) and the first locking lug (130) are provided with matching curved horizontal locking surfaces (180, 190) and
- wherein the second locking recess (90) and the second locking lug (140) are provided with matching inclined horizontal locking surfaces (200, 210).

2. Joining system for floor panels (1) according to claim1, **characterized in** that an intermediate transitional ridge (230) between the first locking lug (130) and the second locking lug (140) is located inside of the entrance opening (120) of the

groove (50), said entrance opening (120) being located in a main vertical joint plane (JP) between two joined floor panels (1).

3. Joining system for floor panels (1) according to claim 1, **characterized in** that an intermediate transitional ridge (230) between the first locking lug (130) and the second locking lug (140) is aligned with the entrance opening (120) of the groove (50), said entrance opening (120) being located in a main vertical joint plane (JP) between two joined panels (1).

4. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that the lower tip portion (160) of the tongue (60) is curved.

5. Joining system for floor panels (1) according to claim 4, **characterized in** that the curvature of the curved lower tip portion (160) of the tongue (60) merges continuously with a corresponding curvature of the horizontal locking surface (190) of the first locking lug (130).

6. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that the first locking recess (80) is shallower than the second locking recess (90).

7. Joining system for floor panels (1) according to any of the preceding claims 1 through 5, **characterized in** that the depth (d) of the first locking recess (90) is less than half of the depth (D) of the second locking recess (90).

8. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that an exit tangent inclination angle (A) of the curved horizontal locking surface (180) of the first locking recess (80) is less than the inclined locking angle (B) of the second locking recess (90).

9. Joining system for floor panels (1) according to claim 8, **characterized in** that said exit tangent inclination angle (A) of the curved horizontal locking surface (180)

of the first locking recess (80) is equal to or less than half the inclined locking angle (B) of the second locking recess (90).

10. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that the curved horizontal locking surface (180) extends from a point located essentially directly below a radial center (rc) of the curved first locking recess (80) in a direction towards the second locking recess (90).

11. Joining system for floor panels (1) according to any of the preceding claims 3 through 10, **characterized in** that the height (h1) of the intermediate transitional ridge (230) measured from a bottom plane (BP) of the floor panel (1) is equal to or less than the corresponding height (h2) of a corresponding inlet ridge (240) of the second locking recess (90).

12. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that the length (c1) of a vertical locking surface (250) of the tongue (60) is less than the corresponding length (c2) of a matching vertical locking surface (260) of the groove (50).

13. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that the minimum thickness (t) between the first locking recess (80) and a bottom plane (BP) of the of the floor panel (1) exceeds a third of the total height (H) of the floor panel (1).

14. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that the introduction angle (C) of the groove (50) is equal to or greater than 10 degrees.

15. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that the length (L1) of the internally extending portion (100) within the groove (50) is less than the length (L2) of the lip portion (110) protruding from an entrance opening (120) of the groove (50).

JOINING SYSTEM FOR FLOOR PANELS

TECHNICAL FIELD

The present disclosure relates to joining system for floor panels. The panels have coupling parts including a groove and a tongue, wherein the tongue is inserted into the groove until the panels are joined together with coupling parts in a mutually engaged position.

BACKGROUND

Panels of the type described above and variations thereof are widely used within laminated flooring and prefabricated parquet flooring. A joining system for floor panels of the described type is known from EP 1 338 721 B1. In this joining system, a groove is shaped for insertion of a tongue on an adjoining panel. The tongue is shaped for locking engagement with the groove. The locking engagement is achieved by means of a locking element on the tongue which engages a locking recess or protrusion in a lip portion protruding from an entrance opening of the groove. The coupling parts exert a tension force towards each other in a mutually engaged position, the tension force being delivered by elastic compression of the material of the coupling parts. The joining system according to EP 1 338 721 B1 and its equivalents is a well proven and widely used design which is suitable for most practical floor coverings. The lip portion in this design is arranged to elastically deflect from the plane defined by two adjoining panels when the tongue is inserted into the groove, which allows the two joined panels to flex in relation to each other and thus deviate from the mutual plane if subjected to an external force directed perpendicularly to the individual planes of the panels. A drawback with the known locking system described in EP 1 338 721 B1 is that the elastic deflection of the lip portion required to achieve a sufficient snap-lock effect is rather significant, which causes high stress on the material in the lip portion. This stress is acceptable in dense materials, but may cause breakages in less dense materials which are used in an increasing extent on the world flooring market to save costs in large scale production of floor panels.

SUMMARY

The object of the invention is to provide a joining system for floor panels which solves the problems with prior art as described above, and to offer an improved joining system with an improved locking function and smooth insertion procedure with a minimum of stress to the material of the lip portion during the joining procedure. Hence, the invention relates to a joining system for floor panels, said floor panels being provided with coupling parts on at least two opposite sides for joining floor panels together. The coupling parts include a groove and a tongue, where the groove is shaped for insertion of a tongue on an adjoining floor panel. The tongue is shaped for locking engagement by means of integrated locking means with the groove in a direction perpendicular to said sides and parallel to a horizontal floor plane defined by the joined floor panels. The coupling parts exert a tension force towards each other in a mutually engaged position, said tension force being achieved by elastic compression of the material of the coupling parts. The invention is especially characterized in that:

- the locking means comprises dual consecutive locking recesses arranged in a lower portion of the groove, a first locking recess of which being located in an internally extending portion within the groove and a second locking recess of which being located in a lip portion (90) protruding from an entrance opening of the groove,
- the locking means further comprises dual consecutive locking lugs arranged in a lower portion of the tongue for horizontally interlocking engagement with said dual consecutive locking recesses in the groove, a first locking lug of which extending downwardly from a lower tip portion of the tongue and a second locking lug of which extending downwardly from a root portion of the tongue,
- wherein the first locking recess and the first locking lug are provided with matching curved horizontal locking surfaces and
- wherein the second locking recess and the second locking lug are provided with matching inclined horizontal locking surfaces.

In an advantageous embodiment of the invention an intermediate transitional ridge between the first locking lug and the second locking lug is located inside of an

entrance opening of the groove, said entrance opening being located in a main vertical joint plane between two joined panels.

According to an alternative beneficial embodiment of the invention, an intermediate transitional ridge between the first locking lug and the second locking lug is aligned with the entrance opening of the groove, said entrance opening being located in a main vertical joint plane between two joined panels.

In an advantageous embodiment of the invention, the tip portion of the tongue is curved. Preferably, the curvature of the curved lower tip portion of the tongue merges continuously with a corresponding curvature of the horizontal locking surface of the first locking lug.

In a beneficial embodiment of the invention, the first locking recess is shallower than the second locking recess. The depth of the first locking recess is less than half of the depth of the second locking recess.

According to a favourable embodiment of the invention, an exit tangent inclination angle of the curved horizontal locking surface of the first locking recess is less than the inclined locking angle of the second locking recess. Preferably said exit tangent inclination angle (A) is equal to or less than half the inclined locking angle of the second locking recess.

Advantageously, the curved horizontal locking surface extends from a point located essentially directly below a radial center of the curved first locking recess in a direction towards the second locking recess.

In a well-functioning embodiment of the invention, the height of the intermediate transitional ridge measured from a bottom plane of the floor panel is equal to or less than the corresponding height of a corresponding inlet ridge of the second locking recess.

In a preferred embodiment of the invention the length of a vertical locking surface of the tongue is less than the corresponding length of a matching vertical locking surface of the groove.

Preferably, the minimum thickness between the first locking recess and a bottom plane of the floor panel exceeds a third of the total height of the floor panel.

In a beneficial embodiment of the invention the introduction angle of the groove is equal to or greater than 10 degrees.

Preferably the length of the internally extending portion within the groove is less than the length of the lip portion protruding from an entrance opening of the groove.

The dual consecutive locking recesses and the matching dual consecutive locking lugs makes the mechanical locking function of the joining system stronger than known joining systems with single locking recesses and locking lugs. The dual locking horizontal function also enables the use of more shallow locking recesses which leaves room beneath the locking recesses for a thicker and more robust lower portion of the groove. This aspect is important for floor panels made of inherently brittle and less dense materials as often used in large scale serial production of floor panels.

It should be emphasized that the term *comprises/comprising* or *includes* when used in this specification is taken to specify the presence of stated features, integers, steps or components but does not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

Further advantages and advantageous features of the invention are disclosed in the following description and in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other aspects, features and advantages of which embodiments of the invention are capable of will be apparent and elucidated from the following description of embodiments of the present invention, reference being made to the accompanying drawings, in which:

Figure 1 is a broken perspective- and cross-sectional view of a typical floor panel according to a first embodiment the present invention, showing the coupling parts on each long side of the floor panel. The cross-sectional view is taken along a cross-section I-I of a floor panel shown in the following Figure 2.

Figure 2 is a simplified top view of a floor panel according to the invention, showing coupling parts on the long sides of the floor panel as well as on the short sides of a typical floor panel.

Figure 3 is an enlarged, side view of two joined floor panels of the type previously shown in Fig. 1. The figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 4 is a simplified side view of a floor panel demonstrating the profile contours of the groove according to the first embodiment of the invention as previously shown in Figs 1 and 3. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 5 is a simplified side view of a floor panel demonstrating the profile contours of the tongue according to the first embodiment of the invention as previously shown in Figs 1 and 3. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 6 is a simplified side view of two adjoining floor panels of the type previously shown in the previous figures, showing angled insertion of the tongue into the groove. An intermediate position of the tongue is drawn with dashed lines.

Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 7 is a simplified side view of two adjoining floor panels of the type previously shown in the previous figures, showing an optional straight horizontal insertion of the tongue into the groove. An intermediate position of the tongue is drawn with dashed lines as is the deflection of the lower lip portion of the groove. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 8 is a simplified side view of a floor panel demonstrating the profile contours of the tongue according to a second, optional embodiment of the invention. The figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 9 is a side view of two joined floor panels of the second embodiment as previously shown in Fig. 8. The figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 10 is a side view of two joined floor panels of a third optional embodiment of the invention.

Figure 11 is a side view of two joined floor panels of a fourth optional embodiment of the invention.

DETAILED DESCRIPTION OF EXAMPLE EMBODIMENTS OF THE INVENTION

Specific embodiments of the invention will now be described with reference to the accompanying drawings. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those

skilled in the art. The terminology used in the detailed description of the embodiments illustrated in the accompanying drawings is not intended to be limiting of the invention. In the drawings, like numbers refer to like elements.

Figure 1 is a broken perspective- and cross-sectional view of a typical floor panel 1 according to a first embodiment the present invention, showing coupling parts 20 on each long side LS of the floor panel 1. The cross-sectional view is taken along a cross-section I-I of a floor panel 1 shown in the following Figure 2. In the joining system the floor panels 1 are provided with coupling parts 20 on at least two opposite sides 30, 40 for joining floor panels 1 together. The coupling parts 20 include a groove 50 and a tongue 60, where the groove 50 is shaped for insertion of a tongue 60 on an adjoining floor panel 1.

Figure 2 is a simplified top view of a floor panel 1 according to the invention, showing coupling parts 20 on the long sides LS of the floor panel 1 as well as on the short sides SS of a typical floor panel 1.

In Figure 3 the joining system according to the invention is illustrated in an enlarged, side view of two joined floor panels 1 of the type previously shown in Fig. 1 and 2. The figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity. The tongue 60 is shaped for locking engagement by means of integrated locking means 70 with the groove 50 in a direction perpendicular to said sides 30, 40 and parallel to a horizontal floor plane FP defined by the joined panels 1, as shown in Fig. 3. The coupling parts 20 exert a tension force towards each other in a mutually engaged position, the tension force being achieved by elastic compression of the material of the coupling parts 20. Unique features of the invention include:

- the locking means 70 comprises dual consecutive locking recesses 80, 90 arranged in a lower portion of the groove 50, a first locking recess 80 of which being located in an internally extending portion 100 within the groove 50 and a second locking recess 90 of which being located in a lip portion 110 protruding from an entrance opening 120 of the groove 50,

- the locking means 70 further comprises dual consecutive locking lugs 130, 140 arranged in a lower portion 150 of the tongue 60 for horizontally interlocking engagement with said dual consecutive locking recesses 80, 90 in the groove 50, a first locking lug 130 of which extending downwardly from a lower tip portion 160 of the tongue 60 and a second locking lug 140 of which extending downwardly from a root portion 170 of the tongue 60,
- wherein the first locking recess 80 and the first locking lug 130 are provided with matching curved horizontal locking surfaces 180, 190 and
- wherein the second locking recess 90 and the second locking lug 140 are provided with matching inclined horizontal locking surfaces 200, 210.

The dual consecutive locking recesses 80, 90 and the matching dual consecutive locking lugs 130, 140 makes the mechanical locking function of the joining system stronger than known joining systems with single locking recesses and locking lugs. The dual locking horizontal function also enables the use of more shallow locking recesses which leaves room beneath the locking recesses for a thicker and more robust lower portion 95 of the groove 50. This aspect is important for floor panels 1 made of inherently brittle and less dense materials as often used in large scale serial production of floor panels.

The extension of the matching curved horizontal locking surfaces 180, 190 of the first locking recess 80 and the first locking lug 130 is illustrated in Fig. 3 as a sector drawn with dashed lines as well as a dashed sector angle arrow below the actual horizontal locking surfaces 180, 190. By the term horizontal locking surfaces is here meant locking surfaces intended to lock the floor panels 1 together in a horizontal direction, i.e. the direction of the floor plane FP and the parallel bottom plane BP as indicated in the figure. Thus, the horizontal locking surfaces 180, 190 are not horizontal per se, but instead exhibit the curved shape shown in the figures.

As is further shown in Fig. 3, an intermediate transitional ridge 230 is located between the first locking lug 130 and the second locking lug 140 inside of the entrance opening 120 of the groove 50. As illustrated in the figure, the entrance

opening 120 is more particularly located in a main vertical joint plane JP between two joined floor panels 1.

An important feature of the invention is that the lower tip portion 160 of the tongue 60 is curved, which greatly facilitates insertion of the tongue 60 into the groove 50. The curvature of the curved lower tip portion 160 merges continuously with a corresponding curvature of the horizontal locking surface 190 of the first locking lug 130.

In order to ensure an easy access for the tongue during the joining procedure, the introduction angle C of the groove 50 is equal to or greater than 10 degrees. Said introduction angle C is defined as the inclination of an inclined introduction guiding chamfer 125, as illustrated in Fig. 3.

As demonstrated in Fig. 3, an exit tangent inclination angle A of the curved horizontal locking surface 180 of the first locking recess 80 is less than the inclined locking angle B of the second locking recess 90. Preferably, the exit tangent inclination angle A is equal to or less than half the inclined locking angle B of the second locking recess 90.

The curved horizontal locking surface 180 extends from a point located essentially directly below a radial center rc of the curved first locking recess 80 in a direction towards the second locking recess 90.

In Fig. 3, tolerance gaps g1, g2 and g3 facilitate production of the joining system. Tolerance gap g1 is formed between the tip of the tongue 60 and the groove 50. Tolerance gap g2 is formed between the second locking recess 90 and the second locking lug 140 on the left side - as shown in Fig. 3 - of the matching inclined locking surfaces 200, 210. Finally, a tolerance gap g3 is formed between a distal end surface 112 of the lip portion 110 of the left floor panel 1 in Fig. 3 and an adjacent lower end surface 113 of the adjoining floor panel 1 shown to the right in Fig. 3.

As further demonstrated in Fig. 3, the length L1 of the internally extending portion 100 within the groove 50 is less than the length L2 of the lip portion 110 protruding from an entrance opening 120 of the groove 50. This feature ensures a robust joining system with improved strength compared to joining systems where the groove 50 is deeper and the tongue is longer than in the proposed joining system.

The length c1 of a vertical locking surface 250 of the tongue 60 is less than the corresponding length c2 of a matching vertical locking surface 260 of the groove 50. This relationship is demonstrated by the dimensions a1, b1, c1 and a2, b2, c2 illustrated with dimension arrows in Fig. 3. Hence c1=b1-a1 < c2=b2-a2.

Figure 4 is a simplified side view of a floor panel demonstrating the profile contours of the groove according to the first embodiment of the invention as previously shown in Figs 1 and 3. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity. As shown in the figure, the first locking recess 80 is shallower than the second locking recess 90. In the shown embodiment, the depth d of the first locking recess 90 is less than half of the depth D of the second locking recess 90. Furthermore, the height h1 of the intermediate transitional ridge 230 measured from a bottom plane BP of the floor panel 1 is equal to or less than the corresponding height h2 of a corresponding inlet ridge 240 of the second locking recess 90. The minimum thickness t between the first locking recess 80 and a bottom plane BP of the of the floor panel 1 exceeds a third of the total height H of the floor panel 1.

Figure 5 is a simplified side view of a floor panel demonstrating the profile contours of the tongue 60 according to the first embodiment of the invention as previously shown in the preceding figures 1 – 4. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 6 is a simplified side view of two adjoining floor panels 1 of the type previously shown in the previous figures, showing angled insertion of the tongue 60 into the groove 50, as indicated with the curved arrow 55. An intermediate position of the tongue is drawn with dashed lines. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity. The angled insertion is greatly facilitated by the smooth gradual engagement of the curvature of the rounded lower tip portion 160 of the tongue 60, resulting in little or no deflection of the lower lip portion 95 of the groove 50.

Figure 7 is a simplified side view of two adjoining floor panels of the type previously shown in the previous figures, showing an optional straight horizontal insertion of the tongue 60 into the groove 50, as indicated with the curved arrow 65. An intermediate position of the tongue is drawn with dashed lines as is the deflection of the lower lip portion 95 of the groove 50. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity. The straight horizontal insertion requires a higher insertion force when joining the floor panels 1 and results in a marked deflection of the lower lip portion 95 of the groove 50, as indicated by the dashed lines.

Figure 8 is a simplified side view of a floor panel 1 demonstrating the profile contours of the tongue 60 according to a second, optional embodiment of the invention. The figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity. In this embodiment, the intermediate transitional ridge 230 between the first locking recess 80 and the second locking recess 90 is aligned with the entrance opening 120 of the groove 50.

Figure 9 is a side view of two joined floor panels 1 of the second embodiment as previously shown in Fig. 8. The figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figures 10 and 11 are side views of two joined floor panels of a third and fourth optional embodiment of the invention. Again, the figures are drawn with

emphasized contour lines and without cross-sectional markings for the sake of clarity. The embodiments shown in Figures 10 and 11 are compatible with the other embodiments of this disclosure, and most features and functions are shared with the other embodiments. The following description will thus focus on the differing features. In the embodiments shown in Figures 10 and 11, the groove 50 comprises a stepped inclined introduction guiding chamfer, forming a first inclined introduction guiding chamfer 125a and a second inclined introduction chamfer 125b. The second inclined introduction guiding chamfer 125b is arranged closer to the vertical joint plane JP and is steeper, i.e. closer to a vertical angle, than the inclined introduction guiding chamfer 125a that is arranged further into the groove 50. The stepped inclined introduction chamfers 125a, 125b facilitates assembly of the floor panels. Furthermore, it is beneficial in terms of manufacturing as tool access is improved. The vertical locking surface 260 of the groove 50 is arranged inside of and adjacent to the first inclined guiding chamfer 125a in the groove 50.

The upper side of the tongue 60 may be concavely shaped, as shown in Figures 10 and 11, with a recess 270 having at least it deepest portion arranged at a lower vertical position than that of the vertical locking surface 250 on the tongue 60. Preferably is the curvature of the upper side of the tongue 60 arranged such that is merges smoothly and transitions from the concave recess 270 to the convex vertical locking surface 260. The rounded, convex shape of the vertical locking surface 250 in turn preferably merges into the curvature of the first locking lug 130. Preferably is the deepest portion of the recess arranged on the tongue 60 such that it will be located inside of the joint plane JP in the groove 50 when the floor panels 1 are connected to each other. The rounded convex shape of the vertical locking surface 250 provides a resilient locking at least partly attributed to the deformation of the vertical locking surface 250 by the contact forces between the tongue 60 and the groove 50. The vertical locking surface 250 on the tongue 60 will be at least elastically deformed upon assembly by its contact with the vertical locking surface 260 in the groove 50, improving the locking of the floor panels and reducing the risk of gaps forming and/or sounds such as squeaking being emitted due to movement between the floor panels. The rounded convex shape of the

vertical locking surface 250 is also beneficial in terms of manufacturing tolerance uptake, as it allows elasticity in the material to absorb tolerances better than a flat shape. The recess 270 further improves the elasticity or resilience in the tongue 60 as a whole, allowing the tongue 60 to provide an improved tension or preload to the joint between the floor panels 1. The recess 270 further facilitates insertion of the tongue 60 into the groove 50.

As is illustrated in the embodiments of Fig. 10 and Fig. 11, the elasticity of the joint between the floor panels can be controlled by adjusting the depth of the groove 60 (i.e. the length L1 of the internally extending portion 100) and the corresponding protrusion of the tongue 50. The embodiment shown in Fig. 11 comprises a more shallow groove 60 and a shorter tongue 50 than that of Fig. 10, and is thus more rigid given that materials of the floor panels 1 etc. are the same. The shallower groove 60 is beneficial in that the lever arm effect of a vertical force applied above the groove 60 and close to the joint plane JP (to the left of the joint plane JP in Fig. 11) will be less significant, compared to that of Fig. 10. I.e., the embodiment shown in Fig. 11 may be beneficial for applications where the joints between the floor panels 1 may be subjected to high loads, as higher loads can be tolerated without risking that the joints between the floor panels 1 become vertically offset due to deformation and thus subjected to increased wear.

In addition, the embodiment shown in Fig. 11 may comprise a first 280 and second contact surface 290 arranged on opposite sides 30, 40 of the floor panel 1, the first and second contact surfaces 280, 290 being arranged to come into contact with each other when the floor panels 1 are assembled and form additional horizontal locking surfaces. The first and second contact surfaces 280, 290 are preferably vertically oriented and parallel to each other such that forces in the joint between the floor panels 1 are distributed over a larger surface area.

Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. It will be further understood that terms,

such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

It is to be understood that the present invention is not limited to the embodiments described above and illustrated in the drawings and a skilled person will recognize that many changes and modifications may be made within the scope of the appended claims.

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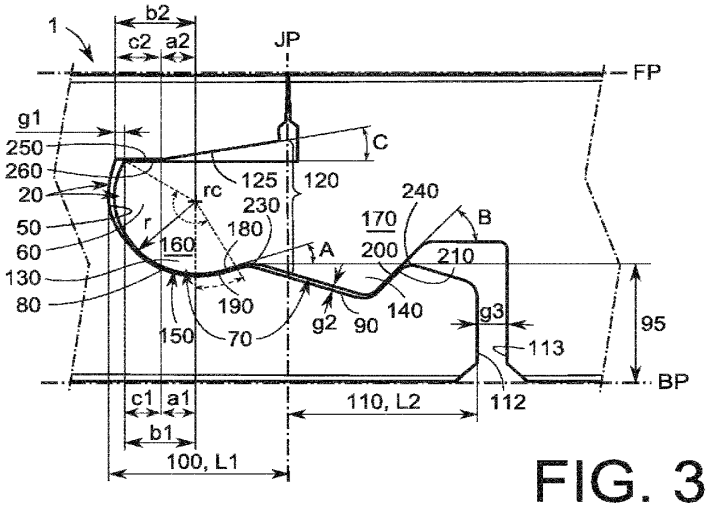


FIG. 3

(57) Abstract: The invention relates to Joining system for floor panels (1). The floor panels (1) are provided with coupling parts (20) on at least two opposite sides (30, 40) for joining floor panels (1) together. The coupling parts (20) include a groove (50) and a tongue (60), where the groove (50) is shaped for insertion of a tongue (60) on an adjoining floor panel (1). The tongue (60) is shaped for locking engagement by means of integrated locking means (70) with the groove (50) in a direction perpendicular to said sides (30, 40) and parallel to a horizontal floor plane (FP) defined by the joined panels (1). The invention is especially characterized in that: - the locking means (70) comprises dual consecutive locking recesses (80, 90) arranged in a lower portion (95) of the groove (50), a first locking recess (80) of which being located in an internally extending portion (100) within the groove (50) and a second locking recess (90) of which being located in a lip portion (110) protruding from an entrance opening (120) of the groove (50), the locking means (70) further comprises dual consecutive locking lugs (130, 140) arranged in a lower portion (150) of the tongue (60) for horizontally interlocking engagement with said dual consecutive locking recesses (80, 90) in the groove (50), a first locking lug (130) of which extending downwardly from a lower tip portion (160) of the tongue (60) and a second locking lug (140) of which extending downwardly from a root portion (170) of the tongue (60), wherein the first locking recess (80) and the first locking lug (130) are provided with

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matching curved horizontal locking surfaces (180, 190) and wherein the second locking recess (90) and the second locking lug (140) are provided with matching inclined horizontal locking surfaces (200, 210).

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JOINING SYSTEM FOR FLOOR PANELS

TECHNICAL FIELD

The present disclosure relates to joining system for floor panels. The panels have coupling parts including a groove and a tongue, wherein the tongue is inserted into the groove until the panels are joined together with coupling parts in a mutually engaged position.

BACKGROUND

Panels of the type described above and variations thereof are widely used within laminated flooring and prefabricated parquet flooring. A joining system for floor panels of the described type is known from EP 1 338 721 B1. In this joining system, a groove is shaped for insertion of a tongue on an adjoining panel. The tongue is shaped for locking engagement with the groove. The locking engagement is achieved by means of a locking element on the tongue which engages a locking recess or protrusion in a lip portion protruding from an entrance opening of the groove. The coupling parts exert a tension force towards each other in a mutually engaged position, the tension force being delivered by elastic compression of the material of the coupling parts. The joining system according to EP 1 338 721 B1 and its equivalents is a well proven and widely used design which is suitable for most practical floor coverings. The lip portion in this design is arranged to elastically deflect from the plane defined by two adjoining panels when the tongue is inserted into the groove, which allows the two joined panels to flex in relation to each other and thus deviate from the mutual plane if subjected to an external force directed perpendicularly to the individual planes of the panels. A drawback with the known locking system described in EP 1 338 721 B1 is that the elastic deflection of the lip portion required to achieve a sufficient snap-lock effect is rather significant, which causes high stress on the material in the lip portion. This stress is acceptable in dense materials, but may cause breakages in less dense materials which are used in an increasing extent on the world flooring market to save costs in large scale production of floor panels.

SUMMARY

The object of the invention is to provide a joining system for floor panels which solves the problems with prior art as described above, and to offer an improved joining system with an improved locking function and smooth insertion procedure with a minimum of stress to the material of the lip portion during the joining procedure. Hence, the invention relates to a joining system for floor panels, said floor panels being provided with coupling parts on at least two opposite sides for joining floor panels together. The coupling parts include a groove and a tongue, where the groove is shaped for insertion of a tongue on an adjoining floor panel. The tongue is shaped for locking engagement by means of integrated locking means with the groove in a direction perpendicular to said sides and parallel to a horizontal floor plane defined by the joined floor panels. The coupling parts exert a tension force towards each other in a mutually engaged position, said tension force being achieved by elastic compression of the material of the coupling parts. The invention is especially characterized in that:

- the locking means comprises dual consecutive locking recesses arranged in a lower portion of the groove, a first locking recess of which being located in an internally extending portion within the groove and a second locking recess of which being located in a lip portion (90) protruding from an entrance opening of the groove,
- the locking means further comprises dual consecutive locking lugs arranged in a lower portion of the tongue for horizontally interlocking engagement with said dual consecutive locking recesses in the groove, a first locking lug of which extending downwardly from a lower tip portion of the tongue and a second locking lug of which extending downwardly from a root portion of the tongue,
- wherein the first locking recess and the first locking lug are provided with matching curved horizontal locking surfaces and
- wherein the second locking recess and the second locking lug are provided with matching inclined horizontal locking surfaces.

In an advantageous embodiment of the invention an intermediate transitional ridge between the first locking lug and the second locking lug is located inside of an

entrance opening of the groove, said entrance opening being located in a main vertical joint plane between two joined panels.

According to an alternative beneficial embodiment of the invention, an intermediate transitional ridge between the first locking lug and the second locking lug is aligned with the entrance opening of the groove, said entrance opening being located in a main vertical joint plane between two joined panels.

In an advantageous embodiment of the invention, the tip portion of the tongue is curved. Preferably, the curvature of the curved lower tip portion of the tongue merges continuously with a corresponding curvature of the horizontal locking surface of the first locking lug.

In a beneficial embodiment of the invention, the first locking recess is shallower than the second locking recess. The depth of the first locking recess is less than half of the depth of the second locking recess.

According to a favourable embodiment of the invention, an exit tangent inclination angle of the curved horizontal locking surface of the first locking recess is less than the inclined locking angle of the second locking recess. Preferably said exit tangent inclination angle (A) is equal to or less than half the inclined locking angle of the second locking recess.

Advantageously, the curved horizontal locking surface extends from a point located essentially directly below a radial center of the curved first locking recess in a direction towards the second locking recess.

In a well-functioning embodiment of the invention, the height of the intermediate transitional ridge measured from a bottom plane of the floor panel is equal to or less than the corresponding height of a corresponding inlet ridge of the second locking recess.

In a preferred embodiment of the invention the length of a vertical locking surface of the tongue is less than the corresponding length of a matching vertical locking surface of the groove.

Preferably, the minimum thickness between the first locking recess and a bottom plane of the floor panel exceeds a third of the total height of the floor panel.

In a beneficial embodiment of the invention the introduction angle of the groove is equal to or greater than 10 degrees.

Preferably the length of the internally extending portion within the groove is less than the length of the lip portion protruding from an entrance opening of the groove.

The dual consecutive locking recesses and the matching dual consecutive locking lugs makes the mechanical locking function of the joining system stronger than known joining systems with single locking recesses and locking lugs. The dual locking horizontal function also enables the use of more shallow locking recesses which leaves room beneath the locking recesses for a thicker and more robust lower portion of the groove. This aspect is important for floor panels made of inherently brittle and less dense materials as often used in large scale serial production of floor panels.

It should be emphasized that the term *comprises/comprising* or *includes* when used in this specification is taken to specify the presence of stated features, integers, steps or components but does not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

Further advantages and advantageous features of the invention are disclosed in the following description and in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other aspects, features and advantages of which embodiments of the invention are capable of will be apparent and elucidated from the following description of embodiments of the present invention, reference being made to the accompanying drawings, in which:

Figure 1 is a broken perspective- and cross-sectional view of a typical floor panel according to a first embodiment the present invention, showing the coupling parts on each long side of the floor panel. The cross-sectional view is taken along a cross-section I-I of a floor panel shown in the following Figure 2.

Figure 2 is a simplified top view of a floor panel according to the invention, showing coupling parts on the long sides of the floor panel as well as on the short sides of a typical floor panel.

Figure 3 is an enlarged, side view of two joined floor panels of the type previously shown in Fig. 1. The figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 4 is a simplified side view of a floor panel demonstrating the profile contours of the groove according to the first embodiment of the invention as previously shown in Figs 1 and 3. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 5 is a simplified side view of a floor panel demonstrating the profile contours of the tongue according to the first embodiment of the invention as previously shown in Figs 1 and 3. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 6 is a simplified side view of two adjoining floor panels of the type previously shown in the previous figures, showing angled insertion of the tongue into the groove. An intermediate position of the tongue is drawn with dashed lines.

Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 7 is a simplified side view of two adjoining floor panels of the type previously shown in the previous figures, showing an optional straight horizontal insertion of the tongue into the groove. An intermediate position of the tongue is drawn with dashed lines as is the deflection of the lower lip portion of the groove. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 8 is a simplified side view of a floor panel demonstrating the profile contours of the tongue according to a second, optional embodiment of the invention. The figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 9 is a side view of two joined floor panels of the second embodiment as previously shown in Fig. 8. The figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

DETAILED DESCRIPTION OF EXAMPLE EMBODIMENTS OF THE INVENTION

Specific embodiments of the invention will now be described with reference to the accompanying drawings. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. The terminology used in the detailed description of the embodiments illustrated in the accompanying drawings is not intended to be limiting of the invention. In the drawings, like numbers refer to like elements.

Figure 1 is a broken perspective- and cross-sectional view of a typical floor panel 1 according to a first embodiment the present invention, showing coupling parts 20

on each long side LS of the floor panel 1. The cross-sectional view is taken along a cross-section I-I of a floor panel 1 shown in the following Figure 2. In the joining system the floor panels 1 are provided with coupling parts 20 on at least two opposite sides 30, 40 for joining floor panels 1 together. The coupling parts 20 include a groove 50 and a tongue 60, where the groove 50 is shaped for insertion of a tongue 60 on an adjoining floor panel 1.

Figure 2 is a simplified top view of a floor panel 1 according to the invention, showing coupling parts 20 on the long sides LS of the floor panel 1 as well as on the short sides SS of a typical floor panel 1.

In Figure 3 the joining system according to the invention is illustrated in an enlarged, side view of two joined floor panels 1 of the type previously shown in Fig. 1 and 2. The figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity. The tongue 60 is shaped for locking engagement by means of integrated locking means 70 with the groove 50 in a direction perpendicular to said sides 30, 40 and parallel to a horizontal floor plane FP defined by the joined panels 1, as shown in Fig. 3. The coupling parts 20 exert a tension force towards each other in a mutually engaged position, the tension force being achieved by elastic compression of the material of the coupling parts 20. Unique features of the invention include:

- the locking means 70 comprises dual consecutive locking recesses 80, 90 arranged in a lower portion of the groove 50, a first locking recess 80 of which being located in an internally extending portion 100 within the groove 50 and a second locking recess 90 of which being located in a lip portion 110 protruding from an entrance opening 120 of the groove 50,
- the locking means 70 further comprises dual consecutive locking lugs 130, 140 arranged in a lower portion 150 of the tongue 60 for horizontally interlocking engagement with said dual consecutive locking recesses 80, 90 in the groove 50, a first locking lug 130 of which extending downwardly from a lower tip portion 160 of the tongue 60 and a second locking lug 140 of which extending downwardly from a root portion 170 of the tongue 60,

- wherein the first locking recess 80 and the first locking lug 130 are provided with matching curved horizontal locking surfaces 180, 190 and
- wherein the second locking recess 90 and the second locking lug 140 are provided with matching inclined horizontal locking surfaces 200, 210.

The dual consecutive locking recesses 80, 90 and the matching dual consecutive locking lugs 130, 140 makes the mechanical locking function of the joining system stronger than known joining systems with single locking recesses and locking lugs. The dual locking horizontal function also enables the use of more shallow locking recesses which leaves room beneath the locking recesses for a thicker and more robust lower portion 95 of the groove 50. This aspect is important for floor panels 1 made of inherently brittle and less dense materials as often used in large scale serial production of floor panels.

The extension of the matching curved horizontal locking surfaces 180, 190 of the first locking recess 80 and the first locking lug 130 is illustrated in Fig. 3 as a sector drawn with dashed lines as well as a dashed sector angle arrow below the actual horizontal locking surfaces 180, 190. By the term horizontal locking surfaces is here meant locking surfaces intended to lock the floor panels 1 together in a horizontal direction, i.e. the direction of the floor plane FP and the parallel bottom plane BP as indicated in the figure. Thus, the horizontal locking surfaces 180, 190 are not horizontal per se, but instead exhibit the curved shape shown in the figures.

As is further shown in Fig. 3, an intermediate transitional ridge 230 is located between the first locking lug 130 and the second locking lug 140 inside of the entrance opening 120 of the groove 50. As illustrated in the figure, the entrance opening 120 is more particularly located in a main vertical joint plane JP between two joined floor panels 1.

An important feature of the invention is that the lower tip portion 160 of the tongue 60 is curved, which greatly facilitates insertion of the tongue 60 into the groove 50.

The curvature of the curved lower tip portion 160 merges continuously with a corresponding curvature of the horizontal locking surface 190 of the first locking lug 130.

In order to ensure an easy access for the tongue during the joining procedure, the introduction angle C of the groove 50 is equal to or greater than 10 degrees. Said introduction angle C is defined as the inclination of an inclined introduction guiding chamfer 125, as illustrated in Fig. 3.

As demonstrated in Fig. 3, an exit tangent inclination angle A of the curved horizontal locking surface 180 of the first locking recess 80 is less than the inclined locking angle B of the second locking recess 90. Preferably, the exit tangent inclination angle A is equal to or less than half the inclined locking angle B of the second locking recess 90.

The curved horizontal locking surface 180 extends from a point located essentially directly below a radial center rc of the curved first locking recess 80 in a direction towards the second locking recess 90.

In Fig. 3, tolerance gaps g1, g2 and g3 facilitate production of the joining system. Tolerance gap g1 is formed between the tip of the tongue 60 and the groove 50. Tolerance gap g2 is formed between the second locking recess 90 and the second locking lug 140 on the left side - as shown in Fig. 3 - of the matching inclined locking surfaces 200, 210. Finally, a tolerance gap g3 is formed between a distal end surface 112 of the lip portion 110 of the left floor panel 1 in Fig. 3 and an adjacent lower end surface 113 of the adjoining floor panel 1 shown to the right in Fig. 3.

As further demonstrated in Fig. 3, the length L1 of the internally extending portion 100 within the groove 50 is less than the length L2 of the lip portion 110 protruding from an entrance opening 120 of the groove 50. This feature ensures a robust

joining system with improved strength compared to joining systems where the groove 50 is deeper and the tongue is longer than in the proposed joining system.

The length c1 of a vertical locking surface 250 of the tongue 60 is less than the corresponding length c2 of a matching vertical locking surface 260 of the groove 50. This relationship is demonstrated by the dimensions a1, b1, c1 and a2, b2, c2 illustrated with dimension arrows in Fig. 3. Hence c1=b1-a1 < c2=b2-a2.

Figure 4 is a simplified side view of a floor panel demonstrating the profile contours of the groove according to the first embodiment of the invention as previously shown in Figs 1 and 3. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity. As shown in the figure, the first locking recess 80 is shallower than the second locking recess 90. In the shown embodiment, the depth d of the first locking recess 90 is less than half of the depth D of the second locking recess 90. Furthermore, the height h1 of the intermediate transitional ridge 230 measured from a bottom plane BP of the floor panel 1 is equal to or less than the corresponding height h2 of a corresponding inlet ridge 240 of the second locking recess 90. The minimum thickness t between the first locking recess 80 and a bottom plane BP of the of the floor panel 1 exceeds a third of the total height H of the floor panel 1.

Figure 5 is a simplified side view of a floor panel demonstrating the profile contours of the tongue 60 according to the first embodiment of the invention as previously shown in the preceding figures 1 – 4. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 6 is a simplified side view of two adjoining floor panels 1 of the type previously shown in the previous figures, showing angled insertion of the tongue 60 into the groove 50, as indicated with the curved arrow 55. An intermediate position of the tongue is drawn with dashed lines. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of

clarity. The angled insertion is greatly facilitated by the smooth gradual engagement of the curvature of the rounded lower tip portion 160 of the tongue 60, resulting in little or no deflection of the lower lip portion 95 of the groove 50.

Figure 7 is a simplified side view of two adjoining floor panels of the type previously shown in the previous figures, showing an optional straight horizontal insertion of the tongue 60 into the groove 50, as indicated with the curved arrow 65. An intermediate position of the tongue is drawn with dashed lines as is the deflection of the lower lip portion 95 of the groove 50. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity. The straight horizontal insertion requires a higher insertion force when joining the floor panels 1 and results in a marked deflection of the lower lip portion 95 of the groove 50, as indicated by the dashed lines.

Figure 8 is a simplified side view of a floor panel 1 demonstrating the profile contours of the tongue 60 according to a second, optional embodiment of the invention. The figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity. In this embodiment, the intermediate transitional ridge 230 between the first locking recess 80 and the second locking recess 90 is aligned with the entrance opening 120 of the groove 50.

Figure 9 is a side view of two joined floor panels 1 of the second embodiment as previously shown in Fig. 8. The figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

It is to be understood that the present invention is not limited to the embodiments described above and illustrated in the drawings and a skilled person will recognize that many changes and modifications may be made within the scope of the appended claims.

5

CLAIMS

1. Joining system for floor panels (1), said floor panels (1) being provided with coupling parts (20) on at least two opposite sides (30, 40) for joining floor panels (1) together, said coupling parts (20) including a groove (50) and a tongue (60), where the groove (50) is shaped for insertion of a tongue (60) on an adjoining floor panel (1), said tongue (60) being shaped for locking engagement by means of integrated locking means (70) with the groove (50) in a direction perpendicular to said sides (30, 40) and parallel to a horizontal floor plane (FP) defined by the joined panels (1), said coupling parts (20) exerting a tension force towards each other in a mutually engaged position, the tension force being achieved by elastic compression of the material of the coupling parts (20), **characterized in** that

- the locking means (70) comprises dual consecutive locking recesses (80, 90) arranged in a lower portion (95) of the groove (50), a first locking recess (80) of which being located in an internally extending portion (100) within the groove (50) and a second locking recess (90) of which being located in a lip portion (110) protruding from an entrance opening (120) of the groove (50),
- the locking means (70) further comprises dual consecutive locking lugs (130, 140) arranged in a lower portion (150) of the tongue (60) for horizontally interlocking engagement with said dual consecutive locking recesses (80, 90) in the groove (50), a first locking lug (130) of which extending downwardly from a lower tip portion (160) of the tongue (60) and a second locking lug (140) of which extending downwardly from a root portion (170) of the tongue (60),
- wherein the first locking recess (80) and the first locking lug (130) are provided with matching curved horizontal locking surfaces (180, 190) and
- wherein the second locking recess (90) and the second locking lug (140) are provided with matching inclined horizontal locking surfaces (200, 210).

2. Joining system for floor panels (1) according to claim1, **characterized in** that an intermediate transitional ridge (230) between the first locking lug (130) and the second locking lug (140) is located inside of the entrance opening (120) of the

groove (50), said entrance opening (120) being located in a main vertical joint plane (JP) between two joined floor panels (1).

3. Joining system for floor panels (1) according to claim 1, **characterized in** that an intermediate transitional ridge (230) between the first locking lug (130) and the second locking lug (140) is aligned with the entrance opening (120) of the groove (50), said entrance opening (120) being located in a main vertical joint plane (JP) between two joined panels (1).

4. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that the lower tip portion (160) of the tongue (60) is curved.

5. Joining system for floor panels (1) according to claim 4, **characterized in** that the curvature of the curved lower tip portion (160) of the tongue (60) merges continuously with a corresponding curvature of the horizontal locking surface (190) of the first locking lug (130).

6. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that the first locking recess (80) is shallower than the second locking recess (90).

7. Joining system for floor panels (1) according to any of the preceding claims 1 through 5, **characterized in** that the depth (d) of the first locking recess (90) is less than half of the depth (D) of the second locking recess (90).

8. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that an exit tangent inclination angle (A) of the curved horizontal locking surface (180) of the first locking recess (80) is less than the inclined locking angle (B) of the second locking recess (90).

9. Joining system for floor panels (1) according to claim 8, **characterized in** that said exit tangent inclination angle (A) of the curved horizontal locking surface (180)

of the first locking recess (80) is equal to or less than half the inclined locking angle (B) of the second locking recess (90).

10. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that the curved horizontal locking surface (180) extends from a point located essentially directly below a radial center (rc) of the curved first locking recess (80) in a direction towards the second locking recess (90).

11. Joining system for floor panels (1) according to any of the preceding claims 3 through 10, **characterized in** that the height (h1) of the intermediate transitional ridge (230) measured from a bottom plane (BP) of the floor panel (1) is equal to or less than the corresponding height (h2) of a corresponding inlet ridge (240) of the second locking recess (90).

12. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that the length (c1) of a vertical locking surface (250) of the tongue (60) is less than the corresponding length (c2) of a matching vertical locking surface (260) of the groove (50).

13. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that the minimum thickness (t) between the first locking recess (80) and a bottom plane (BP) of the of the floor panel (1) exceeds a third of the total height (H) of the floor panel (1).

14. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that the introduction angle (C) of the groove (50) is equal to or greater than 10 degrees.

15. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that the length (L1) of the internally extending portion (100) within the groove (50) is less than the length (L2) of the lip portion (110) protruding from an entrance opening (120) of the groove (50).

ABSTRACT

The invention relates to Joining system for floor panels (1). The floor panels (1) are provided with coupling parts (20) on at least two opposite sides (30, 40) for joining floor panels (1) together. The coupling parts (20) include a groove (50) and a tongue (60), where the groove (50) is shaped for insertion of a tongue (60) on an adjoining floor panel (1). The tongue (60) is shaped for locking engagement by means of integrated locking means (70) with the groove (50) in a direction perpendicular to said sides (30, 40) and parallel to a horizontal floor plane (FP) defined by the joined panels (1). The invention is especially characterized in that:

- the locking means (70) comprises dual consecutive locking recesses (80, 90) arranged in a lower portion (95) of the groove (50), a first locking recess (80) of which being located in an internally extending portion (100) within the groove (50) and a second locking recess (90) of which being located in a lip portion (110) protruding from an entrance opening (120) of the groove (50),
- the locking means (70) further comprises dual consecutive locking lugs (130, 140) arranged in a lower portion (150) of the tongue (60) for horizontally interlocking engagement with said dual consecutive locking recesses (80, 90) in the groove (50), a first locking lug (130) of which extending downwardly from a lower tip portion (160) of the tongue (60) and a second locking lug (140) of which extending downwardly from a root portion (170) of the tongue (60),
- wherein the first locking recess (80) and the first locking lug (130) are provided with matching curved horizontal locking surfaces (180, 190) and
- wherein the second locking recess (90) and the second locking lug (140) are provided with matching inclined horizontal locking surfaces (200, 210).

(Fig. 3)

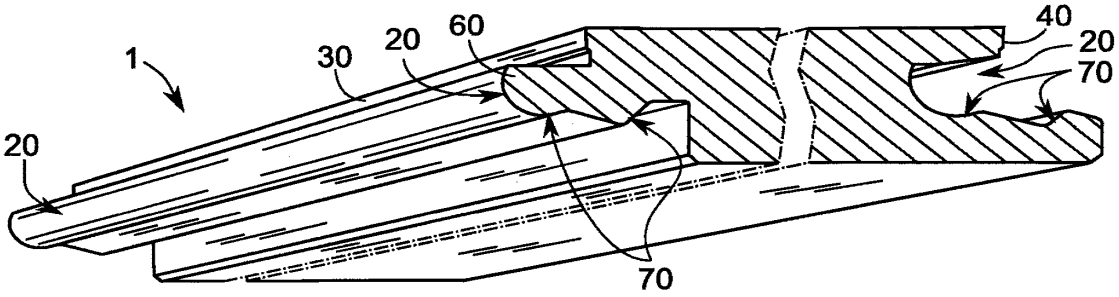


FIG. 1

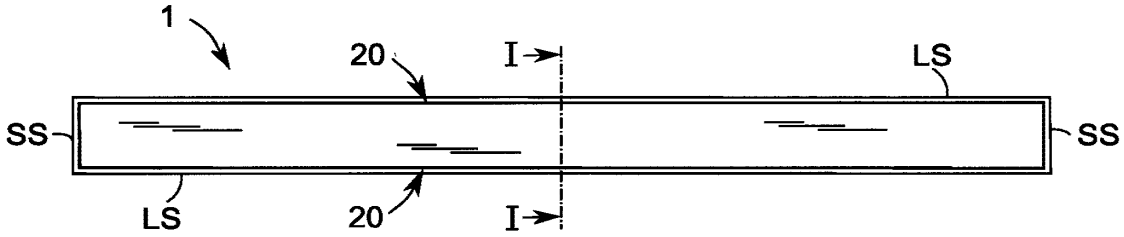


FIG. 2

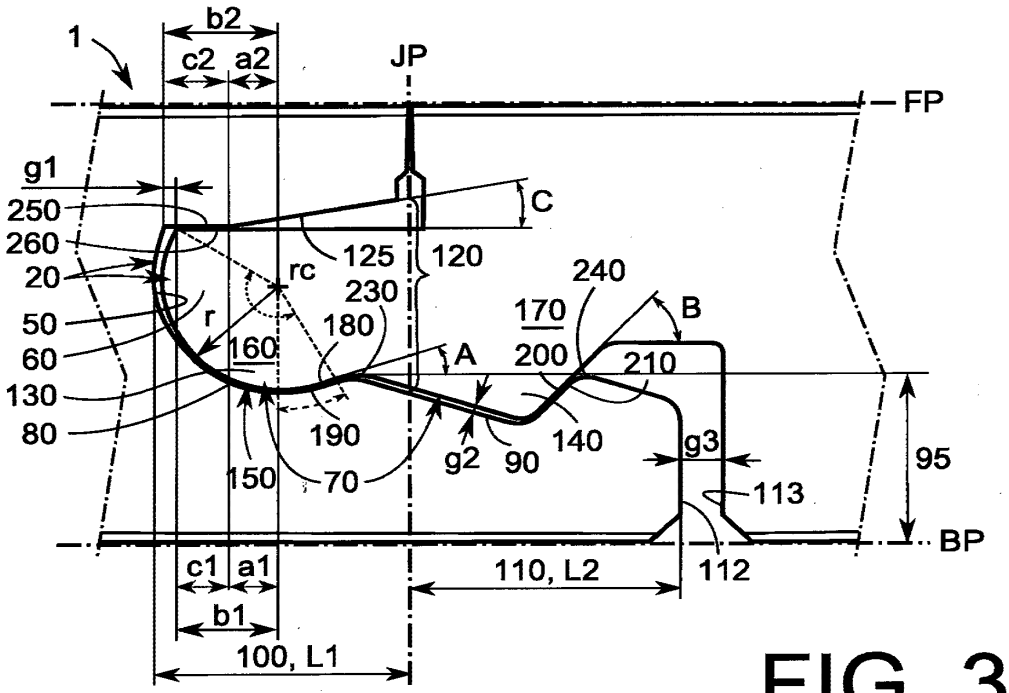


FIG. 3

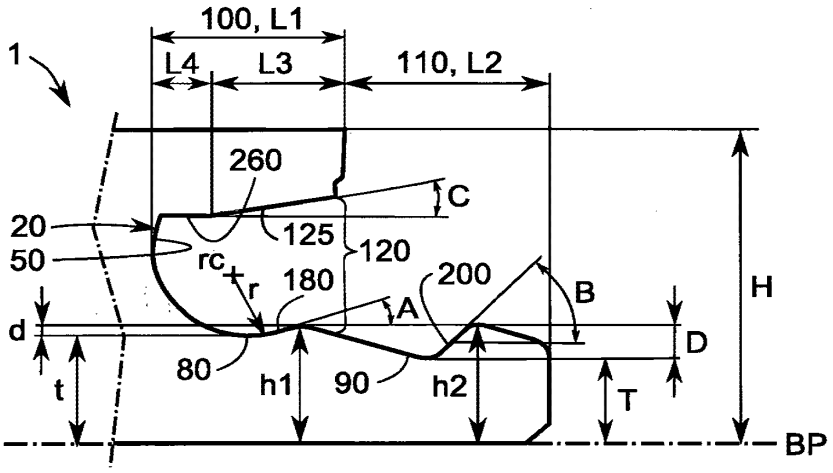

100, L1
L4
L3
110, L2
1
260
C
20
50
125
120
rc
r
180
200
B
H
A
d
D
80
h1
90
h2
T
t
BP

FIG. 4

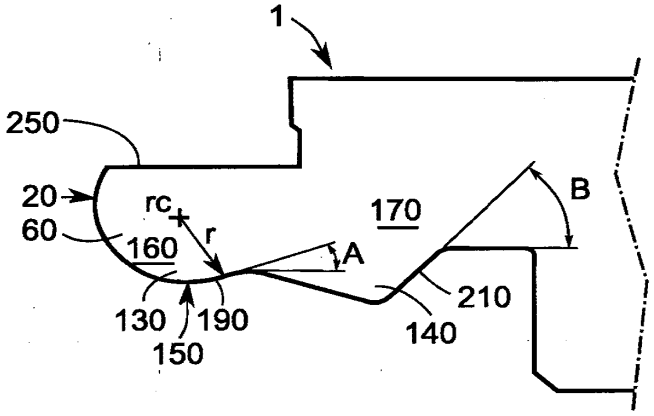

1
250
20
rc
r
170
B
60
160
A
210
130
190
140
150

FIG. 5

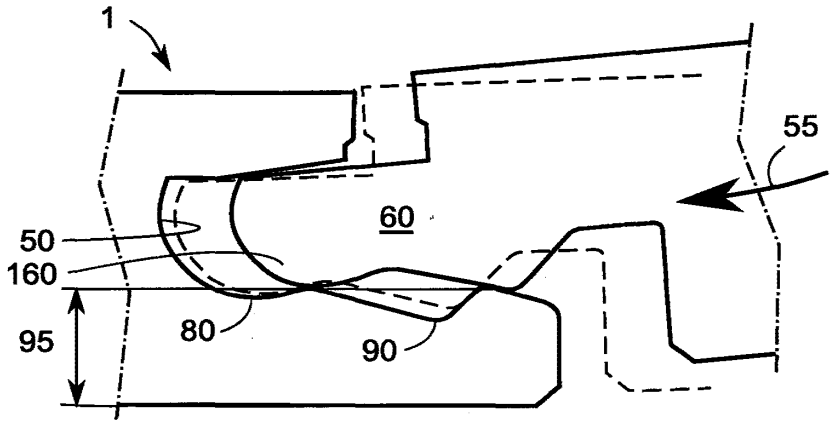


FIG. 6

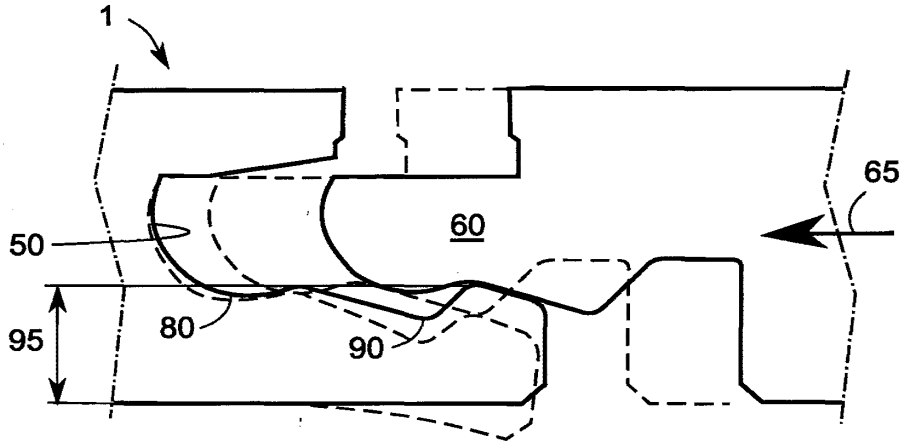


FIG. 7

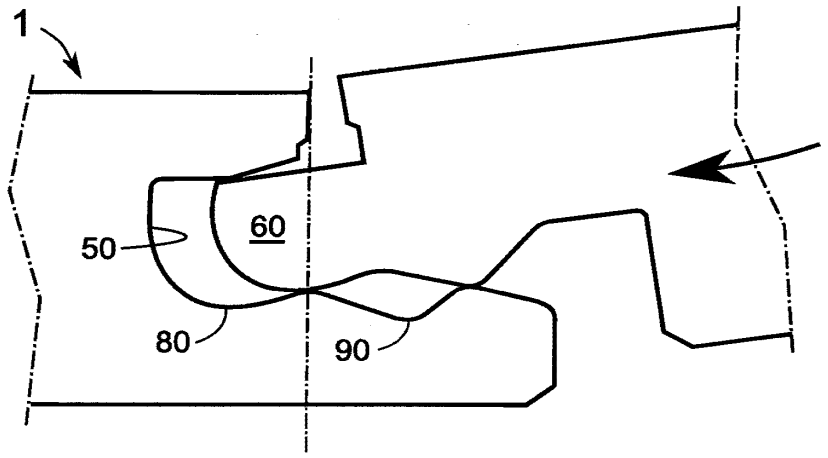


FIG. 8

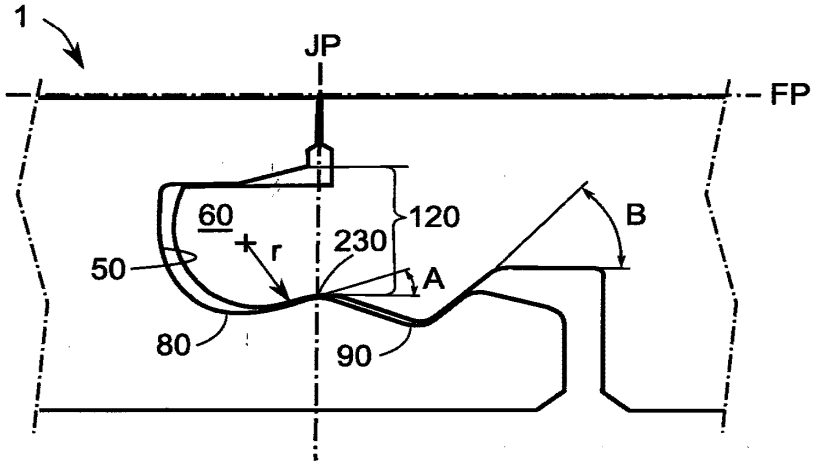


FIG. 9

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DOCUMENT MADE AVAILABLE UNDER THE PATENT COOPERATION TREATY (PCT)

International application number:		**PCT/EP2019/061431**
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	Number:	**1830152-3**
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Date of receipt at the International Bureau:		**09 May 2019 (09.05.2019)**

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a),(b) or (b-*bis*)

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256 67 HELSINGBORG
SUÈDE

Date of mailing *(day/month/year)*
11 December 2019 (11.12.2019)

Applicant's or agent's file reference
W121690005W2

IMPORTANT NOTIFICATION

International application No.
PCT/EP2019/061431

International filing date *(day/month/year)*
03 May 2019 (03.05.2019)

1. The following indications appeared on record concerning:

☐ the applicant ☐ the inventor ☐ the agent ☐ the common representative

Name and Address	State of Nationality	State of Residence
	Telephone No.	
	Facsimile No.	
	E-mail address	

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☒ the person ☐ the name ☐ the address ☐ the nationality ☐ the residence

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	Telephone No. +46 46 190500	
	Facsimile No. +46 46 190510	
	E-mail address mail@sg.se ☐ Notifications by e-mail authorized	

3. Further observations, if necessary:
The appointment of the agent of record has been revoked. The new agent will be recorded upon receipt of the P/A (a request has been sent).

4. A copy of this notification has been sent to:

☒ the receiving Office
☒ the International Searching Authority
☐ the Authority(ies) specified for supplementary search
☐ the International Preliminary Examining Authority
☒ the designated Offices concerned
☐ the elected Offices concerned
☒ other: STRÖM & GULLIKSSON AB

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer
Campin Helene
e-mail pct.team5@wipo.int
Telephone No. +41 22 338 74 05

Form PCT/IB/306 (January 2009) 1/H5N9A3WLT5M350

PTO/SB/08a and 08b (09-08)
Approved for use through 10/31/2008. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if known	
Int'l Application Number	PCT/EP2019/061431
Int'l Filing Date	May 3, 2019
First Named Inventor	Bobby Markovski et al.
Art Unit	To Be Assigned
Examiner Name	To Be Assigned
Attorney Docket Number	A676-3

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document
	1.			
	2.			
	3.			
	4.			
	5.			

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Translation[6]
	6.	DE 20 2007 013059 U1	11-15-2007	Flooring Industries Ltd.	X
	7.	WO 2017/068523 A1	04-27-2017	Flooring Industries Limited SARL	
	8.				
	9.				
	10.				

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
	11.	International Search Report and Written Opinion mailed on June 27, 2019 in corresponding International Application No. PCT/EP2019/061431.
	12.	
	13.	

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1]Applicant's unique citation designation number (optional). [2]See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3]Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4]For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6]Applicant is to place a check mark here if English language Translation is attached. 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 2 hours 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, 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 (1-800-786-9199) and select option 2.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION**	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
W121690005W2		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/EP2019/061431	3 May 2019 (03-05-2019)	4 May 2018 (04-05-2018)
Applicant		
IPENDOR AB		

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

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

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

6. With regard to the **drawings,**
   a. the figure of the **drawings** to be published with the abstract is Figure No. 3
      [X] 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

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2019/061431

A. CLASSIFICATION OF SUBJECT MATTER
INV. E04F15/02
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)
E04F

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, 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	DE 20 2007 013059 U1 (FLOORING IND LTD [IE]) 15 November 2007 (2007-11-15)	1,2,4-15
Y	figures 21-27 paragraph [0092] paragraph [0115] - paragraph [0117] -----	3
Y	WO 2017/068523 A1 (FLOORING IND LTD SARL [LU]) 27 April 2017 (2017-04-27) figure 3 -----	3

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

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

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 June 2019	27/06/2019

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Estorgues, Marlène

1

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2019/061431

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 202007013059 U1	15-11-2007	BE 1017403 A5	05-08-2008
		CN 101563511 A	21-10-2009
		DE 202007013059 U1	15-11-2007
		EP 2099987 A2	16-09-2009
		RU 2009128081 A	27-01-2011
		US 2009320402 A1	31-12-2009
		US 2014318070 A1	30-10-2014
		US 2017089078 A1	30-03-2017
		WO 2008078183 A2	03-07-2008
WO 2017068523 A1	27-04-2017	BE 1023545 A1	28-04-2017
		CA 3001101 A1	27-04-2017
		CN 108138500 A	08-06-2018
		EP 3365512 A1	29-08-2018
		US 2018305937 A1	25-10-2018
		WO 2017068523 A1	27-04-2017

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.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.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/EP2019/061431	03.05.2019	04.05.2018

International Patent Classification (IPC) or both national classification and IPC
INV. E04F15/02

Applicant
IPENDOR AB

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 43*bis*.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 notifed 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:	Date of completion of this opinion	Authorized Officer
European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Fax: +49 89 2399 - 4465	see form PCT/ISA/210	Estorgues, Marlène Telephone No. +49 89 2399-0

Form PCT/ISA/237 (Cover Sheet) (January 2015)

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	3
	No:	Claims	1, 2, 4-15
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-15
Industrial applicability (IA)	Yes:	Claims	1-15
	No:	Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

1 **Re Item V**

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1.1 Reference is made to the following documents:

D1 DE 20 2007 013059 U1 (FLOORING IND LTD [IE]) 15 November 2007 (2007-11-15)

D2 WO 2017/068523 A1 (FLOORING IND LTD SARL [LU]) 27 April 2017 (2017-04-27)

1.2 The present application does not meet the criteria of Article 33(2) PCT, because the subject-matter of claim 1 is not new. D1 discloses a : (***figures 21-27***)

*"Joining system for floor panels (**paragraph 0092 : "ein Fußbodenelement 1"**),*

*a) said floor panels (**"1"**) being provided with coupling parts (**paragraph 0092 : "Koppelmittel oder Koppelteile 9-10"**) on at least two opposite sides (**paragraph 0092 : "an mindestens zwei einandergegenüberliegenden Kanten 5-6"**) for joining floor panels (**"1"**) together,*

*b) said coupling parts (**"9/10"**) including a groove (**paragraph 0092 : "einer Nut 10"**) and a tongue (**paragraph 0092 : "einer Feder 9"**), where the groove (**"10"**) is shaped for insertion of a tongue (**"9"**) on an adjoining floor panel (**"1"**),*

*c) said tongue (**"9"**) being shaped for locking engagement by means of integrated locking means (**paragraph 0115 : "ein Verriegelungssystem 38"**) with the groove (**"10"**) in a direction perpendicular to said sides (**"5/6"**) and parallel to a horizontal floor plane defined by the joined panels (**"1"**),*

*d) said coupling parts (**"9/10"**) exerting a tension force towards each other in a mutually engaged position (**paragraph 0117 : "einer Vorspannung in dem Verriegelungssystem 38"**), the tension force being achieved by elastic compression of the material (**paragraph 0119 : "untere Lippe wieder elastisch verformt ist"**) of the coupling parts (**"9/10"**),wherein*

I4F Exhibit 1003 - 220

*e) the locking means comprises dual consecutive locking recesses (**see figure 25 below**) arranged in a lower portion of the groove (**"10"**),*

*f) a first locking recess (**see figure 25 below**) of which being located in an internally extending portion within the groove (**"10"**) and*

*g) a second locking recess (**see figure 25 below**) of which being located in a lip portion (**paragraph 0115 : "Lippen 39"**) protruding from an entrance opening of the groove (**"10"**),*

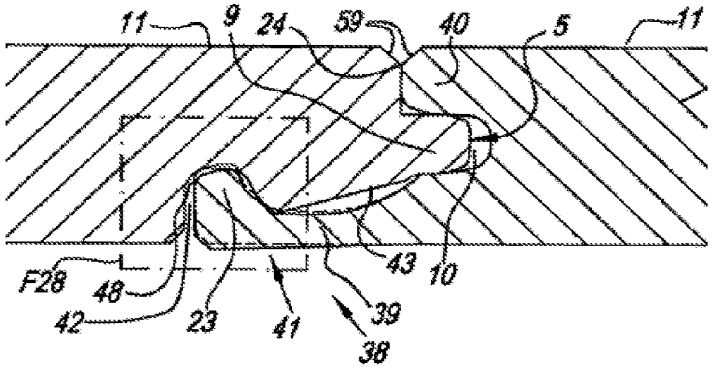
*h) the locking means further comprises dual consecutive locking lugs (**see figure 25 below**) arranged in a lower portion of the tongue (**"9"**) for horizontally interlocking engagement with said dual consecutive locking recesses in the groove (**"10"**),*

*i) a first locking lug of which extending downwardly from a lower tip portion (**paragraph 0115 : "an der Unterseite 43 der Feder 9"**) of the tongue (**"9"**) and*

*j) a second locking lug of which extending downwardly from a root portion (**see figure 25 below**) of the tongue (**"9"**),*

*k) wherein the first locking recess and the first locking lug are provided with matching curved horizontal locking surfaces (**see figure 25 below**),*

*l) wherein the second locking recess and the second locking lug are provided with matching inclined horizontal locking surfaces (**figure 23, paragraph 0116: "Oberflächen 44-45 der vorgenannten Verriegelungselemente 23-42 miteinander in Kontakt kommende Teile 46-47 aufweisen"**)."*

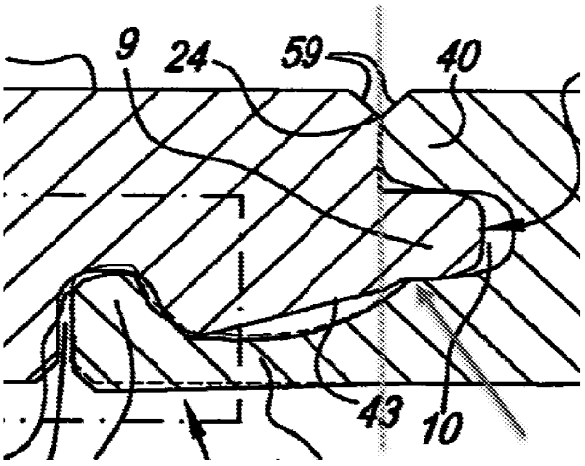


- Figure 25 from D1 -

Hence, the subject-matter of claim 1 is not new (Art. 33(2) PCT).

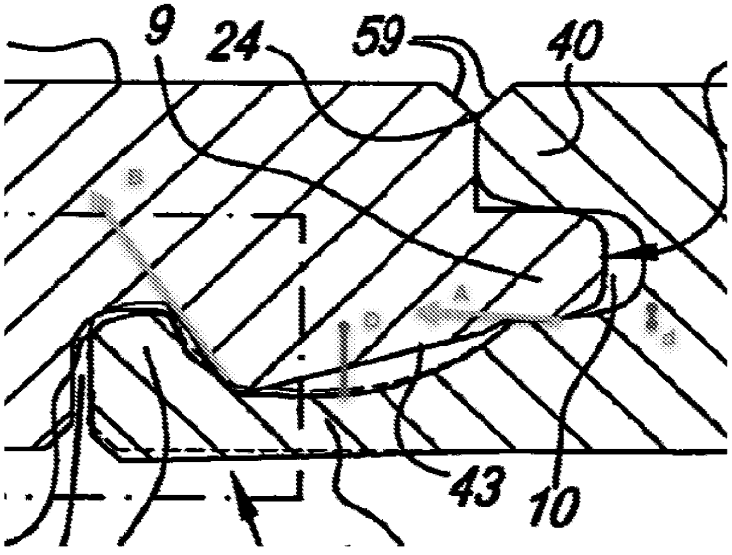
1.3 The additional features of the dependent claims 2 and 4-15 are also directly known from D1 :

Claim 2 : see figures 25 below and 27.



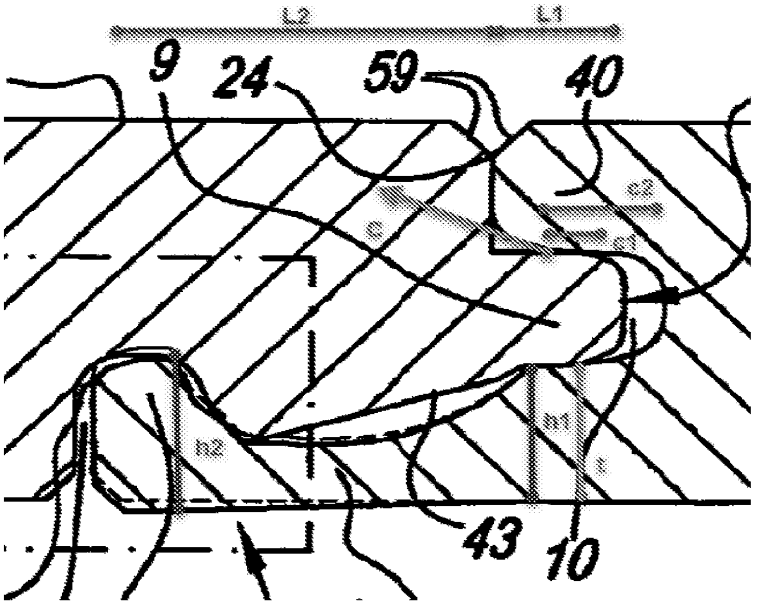
Claims 4-5 : see figures 25 and 27.

Claims 6-9 : see figure 25 below.



Claims 10 : see figure 25.

Claims 11-15 : see figure 25 below.

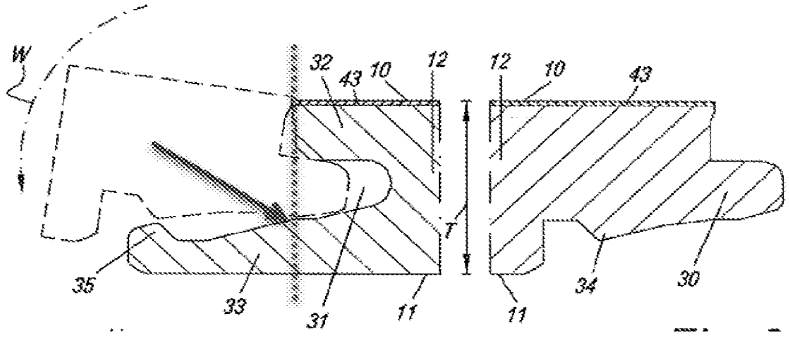


Hence, the subject-matter of claims 2 and 4-15 is not new (Art. 33(2) PCT).

1.4 Inasmuch as the additional features described in the dependent claim 3 are not directly known from the cited documents, they concern only minor modifications to the subject-matter of this prior art, which lie within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can be readily contemplated in advance.

Reference is made e.g. to the following documents :

Claim 3 : see D2, figure 3.



- Figure 3 from D2 -

Hence the subject-matter of claim 3 does not involve an inventive step (Article 33(3) PCT).

2 **Re Item VII**

Certain defects in the international application

2.1 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in D1 and D2 is not mentioned in the description, nor are these documents identified therein.

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Notice

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DESCRIPTION DE202007013059U1

10 This invention relates to floor elements and to floor coverings composed of such floor elements. The invention also relates to locking systems that can be used in the aforementioned floor elements.

13 More particularly, the invention relates to floor elements which are intended to form a floating floor covering and which, when laid, can be coupled to one another at their edges by means of mechanical coupling parts which are either integral with the floor element or not. Such coupling parts can be designed in such a way that they provide for mutual locking of the floor elements both in the horizontal and in the vertical direction, for example as described in the international patent applications WO 94/26999, WO 97/47834, WO 01/98603 and WO 01/96688.

19 In order to increase the ease of laying such flooring elements, efforts are usually made to implement them with relatively large dimensions. This is because large floor elements are more convenient for the user to work with and the putting together of a floor covering takes less time when the user can assume large floor elements. In connection with the shorter installation time, the installation costs of such a floor covering are also lower. With "large floor elements" are meant mainly floor elements of such a size that they can still be easily handled by a single person. Typical dimensions of such floor elements are, for example, 1200 by 200 millimeters.

26 The fact that smaller floor elements or floor elements with smaller, for example less wide, decorative parts, in particular when it comes to wooden parquet or imitation parquet, is in great demand from the aesthetic point of view contradicts the aforementioned endeavors. It should be noted that while smaller wooden floor panels are cheaper than large wooden floor panels in terms of material cost per unit surface area, the greater installation cost of smaller floor panels means that when the total cost of the flooring is factored in, they are more expensive than large wooden floor panels . In addition, long, narrow floor elements have a tendency to curve perpendicularly about an axis to their decorative side, which causes problems when laying such floor elements. These problems are very clear when the floor elements are laid without glue, that is, for example by means of mechanical coupling means, since the aforementioned curvature leads to difficulties in fitting the coupling means into one another.

37 When laying with glue, if the floor elements are bent, the floor elements that have already been

I4F Exhibit 1003 - 225

laid must be strongly tightened with specially designed clamping tools, which the latter are known per se, for example from WO99 / 01629.

40 In order to provide a solution to the above-mentioned contradictions and problems, there are rectangular floor elements in the prior art which per se comprise several decorative parts. Known examples of this are floor elements which comprise or reproduce at least two adjacent wooden trim pieces or rows of wooden trim pieces. Depending on the number of such rows, they are called two-plank, three-plank or four-plank elements. For examples of this prior art solution, reference is made to WO 93/01378.

46 The rectangular floor elements from the prior art described hereinabove have the disadvantage that it is impossible to put together a floor covering with a wild association of decorative parts, since the decorative parts each consist of two or more adjacent rows, depending on whether a two-plank or a Multi-plank element is concerned, in the longitudinal direction of the relevant rows at the edge of one floor element necessarily at the same time merge into decorative parts of another floor element in the floor covering. The lack of game dressing in such a floor covering is found to be troublesome.

53 The prior art includes various proposals for improving two or more plank elements.

54 The above-mentioned WO 93/01378, for example, proposes matching the decorative parts on the opposite short sides of the rectangular floor elements so that the motifs of longitudinally adjoining decorative parts merge where the short sides of two floor elements adjoin one another. It is clear that this technique can only be applied to floor elements with artificially obtained trim, such as trim that includes a printed decoration. In addition, the adaptation of the printed decoration to achieve such a match is time consuming and means a great restriction on the freedom of design. In addition, the lack of game association will always be noticeable if, for example, there are minimal height differences between the various floor elements.

62 JP 07-076923 and JP 07-076923 proposes that the various rows of decorative parts all be of the same length, but to be accommodated in the floor element at a fixed location in the longitudinal direction with respect to one another. The floor elements obtained in this way are no longer rectangular, but have a pair of stair-shaped opposite sides. This suggestion for improving two or more plank elements still has a number of disadvantages. Firstly, the dressing that can be obtained from such flooring elements will still not concern a real game dressing, since the same staircase would always be recognizable in the flooring, and secondly, the proposed flooring elements are difficult to pack because of their staircase shape.

70 The present invention primarily aims at an alternative and / or improved floor element with which an optionally floating floor covering can be formed, which floor element can at the same time lead to increased laying or installation comfort and / or to new laying or installation possibilities. Second, the invention, according to various preferred embodiments thereof, aims at a floor element which can overcome at least one of the aforementioned problems, disadvantages or inconsistencies of the prior art. To this end, the invention relates, according to its first aspect, to a floor element of the type which has coupling means or coupling parts on at least two opposite edges which allow two such floor elements to interact with one another at the relevant edges, with the feature that the floor element comprises at least two components and at least comprises unit-forming means, which, starting from the aforementioned components, can bring

I4F Exhibit 1003 - 226

about a unit, the aforementioned components being able to assume at least two mutual positions, either by means of or not by means of canceling the unit brought about by the aforementioned means.

83 It is clear that several such floor elements can be used to form a floor covering.

84 As mentioned, "unit-forming means" means means or parts which allow a unit to be formed on the basis of the aforementioned components. These are means which are specially provided for the formation of such a unit, with a unit being understood as the smallest possible group of components which can interact as a floor element with identical or similar units or floor elements with the intention of forming a floor covering. It is clear that, within the scope of the present invention, the units concerned should always comprise two or more such components. Furthermore, it is clear that the term unit does not refer to two or more floor panels which are coupled together only in a manner known per se, e.g. from WO 97/46834, or more particularly only by means of an identical pair present on at least two opposite sides of each floor panel complementary coupling agent are coupled.

94 Rather, the unit-forming means of the invention relate to devices which are implemented separately from the identical pairs of complementary coupling means present on the floor elements and / or on each of the relevant components. It is clear that, according to the present invention, it is not excluded that, besides the presence of such identical pairs of complementary coupling means or coupling parts on each component, a separate unit-forming means is also provided on the floor element. For examples of such embodiments, reference is made to the further introduction and the detailed description.

101 It is noted that the units or floor elements that are formed from the components according to the present invention preferably have dimensions that can be easily handled by one person. These are preferably units with a length that is less than two meters and even better in the range of 75 centimeters to 150 centimeters, and with a width that is less than one meter and even better in the range of 15 centimeters to 50 centimeters lies. The floor element preferably has a thickness which is customary in floor panels for parquet or imitation parquet; that is, a thickness between 5 and 25 millimeters.

108 The special feature of the first aspect of the present invention lies in the fact that at least two components of a floor element form a unit and yet can occupy different positions in relation to one another. It is thus possible to design a floor element, of which the aforementioned unit allows the shape of the floor element to be adapted by the user, for example when installing the floor covering. It is also possible for the aforementioned components of the floor elements to assume a certain mutual position in the packaging, for example a mutual position in which the floor elements can easily be packed, while the user can still adjust or set this mutual position as desired before or during the installation of the floor covering. Preferably, the aforesaid components can occupy a mutual position, wherein the floor element has a globally rectangular shape.

118 A rectangular or square shape is very favorable for packaging the floor element.

119 It is clear that the greater the number of different mutual positions of the components, the more possibilities for laying the floor element in question and the easier it is to achieve a wild association of decorative parts. Thus, it is also preferred that these mutual positions can be

I4F Exhibit 1003 - 227

selected freely and preferably without restriction by the user. This is in contrast to an embodiment which allows only a limited number of mutual positions between the aforementioned components. It is noted, however, that this latter embodiment can also have advantages. By restricting the number of possible mutual positions, for example, laying errors can be avoided or one or more laying patterns, such as a herringbone motif, can already be incorporated into the floor elements.

126 In a preferred embodiment, the aforementioned components can be displaced with respect to one another. In the event that the components are designed as plates, more particularly panels or planks, it is preferred that they can be displaced in their length and / or in the width direction in relation to one another. This shifting can be accomplished in two important ways. On the one hand, the displacement can be carried out while the components are in the same plane; on the other hand, such a displacement can also be carried out while the upper sides of the components have been pivoted towards one another through a certain angle.

135 Whether panels or planks are concerned, it is preferred that each of the aforementioned components have a substantially flat side which forms a decorative side, and that this decorative side is more preferably at least partially on the top of the aforementioned unit and / or of the floor element. In such a case it will be clear that the user will be able to position at least the respective four sides of the aforementioned components with respect to one another. This is especially important for creating game associations. Preferably, the aforementioned components have a similar motif globally. So they can have or reproduce a plank motif that consists of a certain type of wood. According to a preferred embodiment, each component has an ornamental side which, viewed in the width of such component, has the appearance of a single plank and, viewed in length, has the appearance of one or more planks. In such a case, components are preferably combined on one and the same floor element which have a different number of wooden trim parts, especially components which, viewed in length, have the appearance of a different number of planks.

148 It is noted that each of the aforementioned components is preferably provided with mechanical coupling means on at least a first pair, and better still on both pairs of opposite sides, which allow mutual coupling, preferably with vertical and horizontal locking being provided on all sides.

152 For the sake of simplicity in the construction and / or assembly of the floor elements into a floor covering, it is advisable to use components which each have a decorative side with uniform and equally large dimensions. However, special effects can also be achieved if the decorative sides of the components of one and the same floor element have, for example, a different length and / or width.

157 According to an important embodiment of the present invention, the aforementioned components have a decorative side with a rectangular elongated shape, the aforementioned interaction preferably being such that the decorative sides of the aforementioned components are positioned at least in the aforementioned two mutual positions with their longitudinal directions next to one another and preferably have the same mutual spacing. This means that the resulting displacement from one mutual position to the other mutual position of the components can, for example, be a pure displacement or displacement of one of the

I4F Exhibit 1003 - 228

components in its longitudinal direction.

165 The aforementioned important embodiment can make it possible, inter alia, to realize an improved floor element of the two- or multi-plank element type. Preferably, the aforementioned decorative sides of the aforementioned components in such a floor element have wooden decorative parts, or one or more rows of wooden decorative parts, which decorative parts or rows can then assume several mutual positions according to this important embodiment. At least during the installation of the floor elements, a user can determine the mutual position which the components of the floor element in question are to assume in the floor covering, and thus create an association of their decorative parts himself. It is noted that if the decorative side of each component has only a single decorative part or only a single row of decorative parts, a floor element is obtained with which a game dressing can be obtained. In other words, in such a case it relates to components with a decorative side which, when viewed in the width of such component, has the appearance of a single plank and, when viewed lengthwise, the appearance of one or more planks.

178 With regard to the unity achieved, it is noted that it can be of various types. Here a distinction is made between two important possible types of unity. However, the invention is not limited to these possibilities or their combinations.

181 A first possible type of unit relates to a unit which is present at least in the aforementioned two mutual positions of the components, or in other words the aforementioned unit-forming means are active at least in the aforementioned two mutual positions. This unit is preferably also retained during the change from one mutual position to the other mutual position of the components.

186 A second possible type of unit relates to a unit which is canceled when one mutual position of the components is changed to the other mutual position. The unit can possibly be such that a possible cancellation thereof is or can be restored when the aforementioned second position is reached and / or when returning to the aforementioned first position. However, it is not excluded that the unit is such that any cancellation thereof is irrevocable. It is noted that when unity is mentioned, it is meant that this cancellation can preferably take place without a power tool. However, the use of hand tools such as a knife, pusher block, hammer or the like is not excluded, but it is preferred that such unit lifting can be done with the bare hand.

194 The unit-forming means can be implemented in many different ways, depending on whether they must be able to bring about a unit of the first and / or the second type and / or another type. Various possible embodiments are explained hereinafter.

197 In a first possible embodiment, the aforementioned unit-forming means consist of at least mechanical coupling means which are located on at least one side of each of the aforementioned components, these mechanical coupling means allowing the respective sides of the aforementioned components to interact with one another. Such mechanical coupling means or coupling parts are preferably designed differently than the mechanical coupling means which the floor element itself has on two opposite edges thereof. "Different" is to be interpreted in the broadest sense, but preferably relates to different dimensions, geometry, material and / or functionality of the coupling means themselves or at least a part thereof. As far as the functionality of the coupling means that form part of the unit-forming means is

I4F Exhibit 1003 - 229

concerned, it is preferred that they have a lock on the respective sides in a vertical direction perpendicular to the surface of the floor element and / or in a horizontal direction perpendicular to the aforementioned sides and in the plane of the Can bring floor element conditions.

209 It is possible for these coupling means to be designed in such a way that they allow the relevant components to be coupled to one another and / or to be detached from one another by inserting a first of the aforementioned components on the relevant side into one or from another of the aforementioned components by means of a Pivoting movement is moved around the relevant page. It is noted that both a unit of the first and the second type can be brought about with the aid of coupling means, for example as described with reference to this first possibility.

216 In a second possible embodiment, the aforementioned unit-forming means consist of at least a part of the floor element which is located on the underside of the floor element and which in turn forms at least one protruding part which extends or can extend from a first component of this floor element under a second component, preferably the protruding part wipes at least one surface almost equal to or greater than the surface of the second component. The aforementioned part then preferably forms a basic structure. According to a first possibility, this basic structure is made in one piece with the first component or, in other words, constitutes a part of this component, so that the first component in fact extends or can extend with the aforementioned protruding part below one or more other components. According to a second possibility, this base structure is designed as a separate base plate or base layer, whereupon the first component is firmly attached, for example glued, and this base plate or base layer with the aforementioned protruding part protrudes beyond this first component.

228 For example, wood-based material or plastic material can be selected as the material for the base plate or base layer. For example, the base structure can comprise a layer of softwood, of the type commonly used in so-called engineered wood, or contain wood fiber material such as HFD wood fiber board, MDF or HDF (medium density fiberboard or high density fiberboard). Eventually the basic structure can also be composed of several parts of layers, either of different materials or not.

234 The basic structure which is used according to the aforementioned second possible embodiment can also fulfill other functions within the totality of the floor element than just bringing about the aforementioned unit. You can worry about the attenuation of reflection and / or passage noise. From this point of view, it is preferable to use so-called HFD wood fiber board containing compressed wood fibers and / or crosslinked polyethylene in the aforementioned base structure. It is noted that with the aid of a part of the floor element which is at least partly located or can extend under the aforementioned components, as described with reference to this second possibility, both a unit of the first type and the second type can be achieved. It is noted that such a basic structure in the case of slender components, for example when at least one of the aforementioned components has a length-to-width ratio that is greater than 10, can contribute significantly to the rigidity of the floor element as a whole and at the same time offer resistance to the warping of such components can, whereby a floor covering can be put together without any problems using such floor elements.

247 In a third possible embodiment, the aforementioned unit-forming means consist of at least one

I4F Exhibit 1003 - 230

separate fastening means which can connect at least the aforementioned components. For example, the unit-forming means can consist of at least one either detachable or non-detachable adhesive or glue connection or a separate mechanical coupling part. By means of the unit-forming means according to this third embodiment, a unit of both the first and the second type can be brought about.

253 It is noted that according to the invention it is not excluded that the unit-forming means are embodied in a different way than according to the possibilities described above and / or that they consist of a combination of the possibilities described above. Such unit-forming means can be provided at any point on the floor element. They can just as well be provided under, on or between the aforementioned components. As an example of a unit-forming agent that is located on the relevant components, the possibility is pointed out to connect the components by attaching either transparent or translucent or opaque or translucent adhesive film to their upper side or decorative side, which adhesive connection must then of course allow the aforementioned Components can take at least the two aforementioned mutual positions. For this application, microspherical sizes of the type as described in WO 00/000000 can be usefully employed.

264 For other and / or practical examples of uniting agents, see the detailed description.

265 Regardless of whether the aforementioned means bring about a unit of the first, the second or another type, it is noted that the unit of the aforementioned components is preferably such that, regardless of the orientation of the floor element, under the action of only the weight of the Components are preserved. It is even better preserved if the floor elements are handled normally. "Normally handled" is understood to mean, inter alia, the removal of the floor elements from the packaging and the delivery of the floor elements to the laying site. It is further noted that, although this is preferred, according to the invention the aforementioned components do not necessarily have to be in a mutual position in the packaging, in which the aforementioned unit consists. According to another embodiment, the aforementioned components can even be packaged separately and there is only talk of a unit after the components have been removed from the packaging and the aforementioned unit-forming means have been used by the user to bring about the unit.

277 It is clear that the floor elements of the present invention can be constructed in various ways.

278 For example, this can relate to floor panels that can be used to form a solid parquet or an imitation of such parquet. In the first case, it is about floor elements, of which at least one of the aforementioned components, and preferably all components, are made of solid real wood, apart from a possible wear-resistant top layer, for example made of varnish or lacquer. The second case concerns floor elements, at least one of which, and preferably each of the aforementioned components, has a core and a top layer attached to it. This top layer, or in any case at least a part of this top layer, can form a decorative side which is at least partially located on the upper side of the floor element. The top layer can be a top layer based on plastic, which preferably contains a printed decoration with, for example, a wood motif, as can be the case with a laminate top layer which is produced using a DPL (Direct Pressure Laminate) or HPL (High Pressure Laminate) process.

289 It is known per se to form a DPL top layer by placing one or more resin-provided carriers, for

I4F Exhibit 1003 - 231

example paper sheets, together with a core material in a press and forming the aforementioned laminate top layer directly on the core material under the influence of heat and pressure. For an HPL top layer, a previously formed laminate top layer is assumed, which per se consists of supports provided with resin, such as for example paper sheets, which laminate top layer is then attached to a core material, more specifically glued onto it. Instead of a top layer based on plastic, a top layer based on wood can also be used, with the wood structure preferably determining the appearance of the aforementioned decorative side. This can be a layer of veneer or a layer of wood that is thicker than veneer, for example thicker than 2 millimeters. For the aforementioned core, on which the top layer is located, a wood-based material can be selected, such as a material based on finely ground wood, for example MDF or HDF (medium-density fiberboard or high-density fiberboard), or such as an either composite or non-composite wood material, for example solid Spruce wood or a so-called lamellar core, a core being composed of different slats.

303 Reference is made to for a general example of a floor panel with a lamellar core.

304 In an important application for so-called "engineeredwood", i.e. floor elements which have a top layer made of a precious and / or hard wood type, under which a layer or structure made of a cheaper wood type is attached, such as from the aforementioned or known, are the components of the floor element of the invention mainly or only from the noble and / or hardwood species, while the basic structure is then realized at least from the cheaper wood species, this basic structure then possibly being put together in a similar way as in one of the ways that are already used in known designs of "engineeredwood" .

311 It is clear that the invention is not limited to floor elements that can be used to form a solid parquet or an imitation thereof. The aforementioned printed decoration, which is used in laminate sheets, can finally also reproduce other motifs than a wood motif. For example, it can reproduce a stone motif or a fantasy motif. In addition, for the aforementioned top layer, use can also be made of top layers based on a material selected from the group of textile, carpet, cork, vinyl, ceramic, natural stone, artificial stone and brick. It is also possible for at least one of the aforementioned components to be constructed from a solid material other than wood, such as stone, compact laminate, plastic or the like.

319 Various possible methods can be used to assemble the floor elements of the first aspect. A first and a second possibility are described below.

321 According to a first possibility, a method for assembling floor elements to form a floor covering can be used, starting with floor elements which comprise at least a first and a second component, and starting from at least one such first component and such a second component, a unit can be brought about by means of unit-forming means and wherein the method comprises at least the step of bringing about such a unit and / or changing such a unit, and at least the step of bringing the aforesaid components into their final position in the floor covering. The unit and the unit-forming means can be implemented in the same way as previously discussed with reference to the first aspect. This first possible method makes it possible, when assembling the floor elements, to make optimum use of the presence of the unit-forming means and of the unit that can form them.

331 Preferably, as mentioned above, changing a unit consists at least in that this unit is at least

I4F Exhibit 1003 - 232

temporarily canceled.

333 Such a method according to this first possibility can be used, for example, for assembling floor elements, the components of which are in a mutual starting position, the step of changing a unit then at least consists in bringing the aforementioned components out of the aforementioned mutual starting position. For example, the aforesaid components can be incorporated into the floor covering as a unit, after which the aforesaid unit may be changed before reaching their respective mutual positions. If the floor elements have a rectangular, possibly elongated, unit in the aforementioned mutual starting position of the components, a very practical laying method is obtained. The floor elements can also be packed in this mutual starting position, but not necessarily.

342 The method can also be used for assembling a floor covering, wherein the aforementioned unit-forming means are active in the final positions of the aforementioned components, in other words, in these final positions, bring a unit between a first and a second component state. The fact that the unit consists at least in the final position of the components can, depending on the unit-forming means used, provide various different advantages in relation to the thickness of the floor covering obtained, reduction of reflection or passage noise and the like.

348 Each of the aforementioned components can be provided with a decorative side which, in the final position of the component in question in the floor covering, is intended to form part of the floor surface. In this case, the method preferably comprises at least the step of changing the mutual positions of the relevant decorative sides after the components have already been introduced into the plane of the floor covering.

353 According to a second possibility, a method for assembling floor elements to form a floor covering can be used, these floor elements not necessarily comprising unit-forming means in the sense of the first aspect. For this purpose, this second possible method is based on a first component and a second component, which are in a mutual starting position, each of these components being provided with a decorative side which, in the final position of the component in question in the floor covering, is intended to represent a part of the To form a floor surface, the method successively comprising at least the steps of bringing both the first and the second component together in the aforementioned mutual starting position into the surface of the floor covering, bringing the first and the second component out of the mutual starting position and in their respective final position in attaching both at least the aforementioned first component and at least the aforementioned second component to the floor covering.

364 Thanks to the fact that two movable components are brought together in the plane of the floor covering, the laying time required in such a method can be limited. If it is ensured that the floor elements in the aforementioned mutual starting position of the components have a rectangular, and even better also an elongated shape, the laying time can be restricted even further, since such floor elements are generally very practical in use.

369 The aforementioned step of bringing the first and second component out of the mutual initial position preferably includes that the second component is applied in the floor covering in a position displaced in relation to the aforementioned first component. Preferably, the aforesaid first component is brought into its final position in the floor covering before the second component is brought into its final position in this floor covering.

I4F Exhibit 1003 - 233

374 The aforesaid first and second possible methods are preferably used to form a floor covering that reproduces rows of decorative parts, this floor covering comprising at least a first row of decorative parts formed by first components and also at least a second row of decorative parts formed by second components Components is formed, wherein the aforementioned first row and the aforementioned second row are laterally, that is, in the width direction of the rows, directly next to one another. It is also possible for each row of decorative parts to be composed of only one of the aforementioned components. In the case of a floor element of the two-plank element type, a row of first components is preferably alternated with a row of second components. It is clear that, depending on the number of components of the floor element, preferably adjacent rows of first, second, third and further components are formed in the floor covering.

385 It is noted that the aforesaid two or more components may have respective decorative sides with substantially the same dimensions as well as decorative sides with different dimensions. For example, decorative pages of different widths and / or different lengths can be used. In the most preferred embodiment of the invention, however, all components of one and the same floor element have the same length and preferably also the same width.

390 It is clear that the first and / or the second possible method can be used for laying the floor elements with the features of the first aspect and the preferred embodiments thereof. The methods for assembling floor elements are preferably used which have coupling means on at least two opposite edges which allow two such floor elements to interact with one another at the respective edges.

395 In such a case, the method preferably also comprises at least the step of coupling the floor elements to the relevant edges.

397 The first and / or especially the second possible method also provide considerable advantages if the width of the components is less than 10 centimeters. Finally, according to the method, more manageable and installable packages of these components are used. In fact, either a unit of at least two of these components is used, or a step is carried out which consists of introducing at least two components together into the floor covering.

402 The first and / or the second possible method are particularly effective if flooring elements with two or more components are assumed that are in the same positions next to each other and thus define a globally rectangular, either elongated or square whole in their starting position, and then by means of of the method, a final position is created by bringing one or more of the aforementioned components into a displaced position with respect to the other components. It is more particularly preferred to start from components with decorative sides which represent elongated slats or planks, these extending in the starting position with their long sides parallel to one another.

410 It is further clear that the invention also relates to a floor covering which is put together on the basis of the floor elements of the first aspect and / or on the basis of the aforementioned first and / or second possible method. The invention also relates to a set of two or more components and unit-forming means which are intended to form a unit on the basis of the aforementioned components, and which set makes it possible to put together a floor element according to the first aspect of the invention, or at least at least part thereof. The invention

I4F Exhibit 1003 - 234

further relates to a component for a floor element which is intended to form a unit together with a second component, either similar or not of the same type, by means of unit-forming means. It is clear that such sets and components can give rise to the assembly of flooring elements which have the features of the first aspect and can thus also bring about the advantages linked to this aspect.

421 The invention further relates to a locking system which can be usefully applied to floor elements having the features of the first aspect, but is not limited to such floor elements. To this end, the invention relates, according to a second independent aspect, to a locking system for the lateral coupling of floor elements or components of floor elements, the locking system being of the type which, when coupling one side of a first floor element to a side of a second floor element, locks the floor elements both in a vertical direction perpendicular to the plane of the floor elements, as well as in a horizontal direction perpendicular to the respective coupled sides, the locking system consisting at least of coupling means, which essentially act as a tongue on the aforesaid side of the first floor element and a groove delimited by a lower lip and an upper lip on the aforesaid Side of the second floor element and which are also provided with locking means, the aforesaid locking means having a protruding locking element on one of the the groove delimiting the aforesaid lips and a cooperating locking element on the tongue, with the feature that the locking system allows coupled floor elements to adopt at least two mutual orientations on the respective coupled side, namely on the one hand a first mutual orientation, the upper sides of the floor elements being essentially in on the same plane and with surfaces of the aforesaid locking elements having parts coming into contact with one another, which extend between a lower and an upper horizontal plane, and on the other hand a second mutual orientation in which the upper sides of these floor elements enclose an angle of less than 180 degrees and the aforesaid surfaces of the Locking elements are free from mutual contact, the part of a first of these surfaces coming into contact in the first mutual orientation being in the second mutual orientation above the aforesaid upper horizontal plane, and wherein the floor elements on the respective side in the second mutual orientation are still locked in both vertical and horizontal directions.

444 By the fact that the part of a first of the surfaces of the locking elements which comes into contact in the first mutual orientation extends in the second mutual orientation above the aforementioned upper horizontal plane, it is meant that the surfaces which formed a contact in the aforementioned first mutual orientation, completely rotated away from each other or in other words no longer facing each other.

449 The fact that the locking system allows the floor elements or their components to adopt a mutual orientation, in which the contact at the level of the locking elements is completely canceled, can ensure that the floor elements in this orientation, while they are still coupled in the vertical and horizontal direction, with the smallest possible Resistance can move along each other. This property can be usefully applied in many laying ways and safely in the aforementioned first and / or second possible methods of assembling floor elements with the features of the first aspect.

456 The floor elements are preferably coupled without play in the aforementioned first mutual orientation. This preferred embodiment results in the particularly useful combination of a

I4F Exhibit 1003 - 235

backlash-free coupling with an easily longitudinally displaceable connection.

459 In the second mutual orientation, on the other hand, there is preferably a clearance between the sides of the floor elements coupled by means of the locking system, this clearance allowing the floor elements to move over a limited distance in the horizontal direction, and that preferably in the aforementioned second mutual orientation the aforementioned locking in the vertical direction and horizontal direction over at least half, and better still the entire range of the possible movement coupled to the clearance is preserved. With this preferred embodiment it is achieved that the ease of displacement can be maximized, while the risk of decoupling of the connection of the floor elements or their components is minimized.

467 It is possible that in the aforementioned first mutual orientation, the aforementioned lip, which forms the protruding locking element, is elastically deformed. In such a case, it is preferably less or not deformed in the aforementioned second mutual orientation; for example, in the aforementioned second mutual orientation, only a plastic deformation of this lip remains or, even better, completely or as well as completely returned to the position it assumed before the floor elements were coupled to the relevant side. If a residual portion of the deflection is found in the second mutual orientation, it is best that it is less than half the deflection in the first mutual orientation so that most of the deflection is elastic.

475 In the most preferred embodiment, the aforesaid lip containing the protruding locking element relates to the aforesaid lower lip. Such a locking system can easily be produced, for example, by means of a milling process, the relevant sides then being provided with areas provided with profiles, which are preferably made in one piece with the floor panel. Such a milling process can be used even more easily when the lower lip extends beyond the upper lip. Of course, the invention is not limited to locking systems with a longer lower lip. The lower lip can, for example, also be made the same length as the upper lip or shorter than this. With regard to milling operations, reference is also made to WO 97/47834, which concerns inter alia the milling of coupling means located on the edge of floor panels.

484 The mutual orientations that the locking system allows can be adopted by the floor panels in any way. Preferably, the floor elements can be brought from the first to the second mutual position with a relative pivoting movement about the coupled side.

487 It is noted that the fact that the locking system allows two mutual orientations between the floor elements or components does not mean that the floor elements in question, once the orientation in question is reached, will by themselves remain in that orientation, although this is not excluded. Rather, it is meant that the locking system allows the user to bring the coupled floor elements into these two mutual orientations and / or hold them therein, preferably by hand.

493 Preferably, the locking system of the second aspect also allows that coupled floor elements can assume at least one third mutual orientation on the respective coupled side, the upper sides of these floor elements enclosing an angle which is smaller than the angle which they include in the second mutual orientation, and wherein the aforesaid locking elements also have surfaces coming into contact. In this third mutual orientation, the floor elements are even better coupled without play. In this third mutual orientation, too, it is possible for the aforementioned lip, which contains the protruding locking element, to be elastically deformed. This preferred embodiment

I4F Exhibit 1003 - 236

provides an additional barrier against the uncoupling of the floor elements. It goes without saying that it remains possible to decouple the floor elements, but it is possible that a certain resistance first has to be overcome.

503 In the same regard as in the second aspect, the invention in its third aspect relates to a locking system for laterally coupling together floor elements or components of floor elements, the locking system being of the type which, when coupling one side of a first floor element to a side of a second floor element, locks the floor elements in both a vertical direction perpendicular to the plane of the floor elements, as well as in a horizontal direction perpendicular to the respective coupled sides, the locking system consisting at least of coupling means, which are essentially a spring on the aforementioned side of the first floor element and one by means of a lower lip and an upper lip limited groove are made on the aforementioned side of the second floor element and which are also provided with locking means, the aforementioned locking means having a protruding verri control element on one of the above-mentioned lips delimiting the groove and a locking element on the spring which cooperates therewith and the aforesaid lip, which comprises the protruding locking element, is elastically deformed in a coupled state of two floor elements, the locking system allowing two floor elements coupled therewith by means of a relative pivoting movement coupled side can be uncoupled from each other, with the feature that the locking system is designed so that the aforementioned elastic deformation of the lip, which comprises the protruding locking element, undergoes at least three successive changes when the floor elements are uncoupled by means of the aforementioned pivoting movement, namely a first change in which the elastic deformation decreases, a second change in which the elastic deformation increases, and a third change in which the elastic deformation decreases again.

523 Preferably, the aforementioned pivoting movement relates to a movement, the included angle between the upper sides of both floor elements decreasing.

525 The fact that the elastic deformation decreases during the first change and then increases again during a second change means that at the end of the first change the flooring elements come into a mutual orientation in which this elastic deformation has a local minimum and they are therefore less firmly connected, however, this also means that the risk of decoupling by further pivoting out is minimized in that the aforementioned increase in elastic deformation during the second change forms a barrier to it. A mutual orientation, in which there is a local minimum of the elastic deformation, opens up various new possibilities. For example, it can be ensured that the floor elements in the mutual orientation, in which the local minimum of the elastic deformation is reached, can move along one another with the least possible resistance while they are still coupled in the vertical and horizontal directions.

535 This property can be usefully applied in many laying processes and certainly in the case of the aforementioned first or second method for assembling floor elements.

537 The aforesaid elastic deformation can for example comprise or relate to a bending of the lip in question. In such a case it is preferred that during the aforesaid first change a deflection of the relevant lip decreases, preferably by at least 50 percent; that during the second change the curvature of the respective lip increases and that during the third change the curvature of the respective lip decreases again. The aforesaid lip comprising the protruding locking element

I4F Exhibit 1003 - 237

relates preferably to the lower lip.

543 In a preferred embodiment of the third aspect, the aforementioned elastic deformation and / or the bending of the relevant lip decreases during the first and / or the third change until it is as good as completely or completely relaxed. When complete relaxation is achieved at the end of the first change, the convenience of sliding both floor elements or components along the coupled sides is maximized.

548 It is clear that the invention also relates to a floor element of the type which has coupling means on at least two opposite sides, and preferably on all opposite sides, with the feature that the aforementioned coupling means allow, with the coupling means of a similar floor element, a locking system with the features of second and / or third aspect of the invention.

552 It is further clear that the unit-forming means of the floor elements of the first aspect can consist of at least one locking system with the features of the second and / or third aspect, with which the aforementioned components are then preferably coupled. It is also possible that the aforementioned coupling means, which have the floor elements of the first aspect on at least two opposite edges, make it possible to form a locking system according to the second and / or the third aspect with the coupling means of a similar floor element. It is further possible that the aforementioned components are coupled to one another with the aid of a locking system according to the second and / or the third aspect, whether unit-forming means are concerned or not.

561 The invention further relates to a locking system which is extremely convenient for use on at least one pair of opposite sides of the aforementioned components and which still allows easy installation of the floor elements of the invention in difficult to reach places, such as under overhanging cabinets or under door posts. In the case of elongated, rectangular components, the locking system in question is preferably used on the short opposite sides of these components, while on the long sides of these components a locking system is preferably used which allows at least one coupling by means of a pivoting movement. The subject locking system is not only useful with the flooring elements of the present invention, but can also be applied more broadly to any flooring element. According to a fourth independent aspect thereof, the invention relates to a locking system for laterally coupling together floor elements or components of floor elements, this locking system being essentially composed of a male coupling part and a female coupling part which are located on the edges of the floor elements or components to be coupled, whereby the aforesaid coupling parts are provided with locking means which, in a coupled state of a side of a first floor element or component and a side of a second floor element or component, bring about a locking of the floor elements or components in a horizontal direction perpendicular to the coupled sides in the plane of the floor elements or components, with these coupling parts however, they are free of locking means which, when coupled to the relevant side, lock in a vertical direction s bring about perpendicular to the plane of the floor elements or components, with the feature that the aforesaid coupled state can optionally be obtained with the aid of the aforesaid locking system by either attaching the aforesaid male coupling part of the first floor element or component with a substantially downward movement in the female coupling part of the second floor element or component or by moving the first and the second floor element or component with the edges which are

I4F Exhibit 1003 - 238

provided with the aforesaid coupling parts towards one another with a substantially horizontal sliding movement.

586 The fourth aspect of the invention therefore relates to a locking system which allows both a locking by means of a downward movement and a locking by means of a mainly horizontal sliding movement of the components, with which, however, only a horizontal locking is obtained and no vertical locking of the relevant components or floor elements is obtained.

590 With the intention of making the features of the invention clearer, some preferred embodiments are described below, by way of example without any restrictive character, with reference to the accompanying drawings, in which:

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596 represents in perspective a floor element according to the invention;

2

600 shows the floor element of Figure 1, two components of which occupy a different mutual position than is the case in Figure 1;

3

605 represents a section according to the line III-III shown in FIG.

606 Figures 4 to 6 show variants of the floor element of Figure 1, in a view similar to that of Figure 3;

608 7represents a variant of the floor element of FIG. 1 in a view similar to that of FIG. 2;

609 8shows a section according to line VIII-VIII shown in FIG. 7;

610 9represents a variant of the floor element of FIG. 7 in a view similar to that of FIG. 8;

611 10Figure 3 represents a section according to line X-X shown in Figure 7;

612 11in a view similar to that of FIG. 8 shows another variant;

613 12shows a variant in a view similar to that of FIG. 10;

614 13Figure 12 shows a view of the area indicated by F13 in Figure 12;

615 14shows a variant in a similar view;

616 15 and 16 also show a variant, each in a view similar to that of FIGS. 9 and 10;

617 17and FIG. 18 shows another variant in cross section, FIG. 18 giving a view of the area indicated in FIG. 17 with F18;

619 19 and 20 still show variants in a view similar to that of FIG. 15 or 17;

620 FIGS. 21 to 30 show locking systems according to the invention, FIGS. 23, 24, 28, 29 and 30 showing views of the areas indicated in 21 with F23, in 22 with F24, in 25 with F28, in 26 with F29 and in 27 with F30;

623 Figures 31 to 33 show still further variants of floor elements according to the invention in a view similar to that of Figure 8;

625 FIGS. 34 to 40 illustrate some special variants and their application in a floor covering;

I4F Exhibit 1003 - 239

626 Figures 41 and 42 illustrate different steps in one possible method of assembling the flooring elements of the invention;

628 Figures 43 and 44 illustrate a variant of such a method;

629 45 to 48 show still preferred embodiments of a floor element according to the first aspect, wherein 46 shows, on a larger scale, a view of the area which is indicated by F46 in FIG. 45 and FIGS. 47 and 48 respectively show views according to the line XLVII-XLVII shown in FIG. 46 and the line XLVIII-XLVIII shown in FIG.

633 Figures 49 and 50 also show, in cross section, locking systems which can be used in a floor element according to the invention.

635 1

636 shows a floor element 1 according to the invention.

637 Such a floor element 1 is, as mentioned above, assembled from at least two components 2-3 to form a unit 4.

639 In the example the floor element comprises two components which are designed as planks or slats which, as shown in FIG. 1, can assume a mutual position P1, in which the floor element 1 has a globally rectangular and in this case elongated shape. In this mutual position P1 it is clear that the floor element 1 shown has coupling means or coupling parts9-10 on at least two opposite edges5-6, for example on the opposite long edges5-6 and / or short edges7-8. In this case, the coupling means are designed essentially in the form of a tongue 9 and a groove 10 and allow two such floor elements 1 to be coupled to one another at the relevant edges 5-6-7-8.

647 Each of the aforementioned components 2-3 has a substantially flat side which forms a decorative side 11. These decorative sides 11 are located at the top of the assembled floor element 1, where in this case they form or represent two rows 12 of decorative parts 13 lying next to one another. The floor element then also relates to an example of an improved multi-plank element, more specifically two-plank element.

652 The improvement achieved according to the invention in this type of floor elements 1 is obtained by the fact that, although the aforesaid components 2-3 form a unit 4, they can, as fig Unit4. The aforementioned components 2-3 can, in this case in their longitudinal direction L, be displaced with respect to one another. By attaching the floor elements 1 to the floor covering in such a way that the components 2-3 are in this second mutual position P2, it is achieved that the aforementioned rows 12 of decorative parts 13 of this improved two-plank element at the aforementioned short edges 7-8 of the floor element 1 no longer simultaneously merge into the decorative parts 13 of a similar adjacent floor element. It is noted that the unit 4 presented here allows more than two mutual positions P1-P2 of the components 2-3, since the components 2-3 can be displaced along one another over the entire length L1 of a side 5 of the floor element 1.

663 3 indicates that each of the two components 23 can be provided with at least one pair of complementary coupling means or coupling parts 9-10A-9A-10, by means of which they can be connected to one another or to other such components both in the horizontal direction H1 and in the vertical direction V1. As announced in the introduction, it is known to use pairs of complementary coupling agents to make floor panels cooperate with one another. It is noted

I4F Exhibit 1003 - 240

that the illustrated coupling means 10A-9A allow the components 2-3 to be displaced with respect to one another along their coupled sides 5A-6A; they can also be released from one another with at least one pivoting movement. It is further noted that the coupling means 9-10, with which the floor elements can be coupled to one another, in the example form part of the aforementioned pairs of complementary coupling means 9-10A-9A-10, which are present on the components 2-3. As will become clear in further examples, this is not necessarily the case.

674 For the sake of clarity, it is noted that coupling means, which are primarily intended to connect components with one another, are indicated in this description and the accompanying figures with a reference number with the suffix A, while coupling means, which are primarily intended to connect floor elements together, are indicated by a reference number without a suffix.

678 The peculiarity of the floor element 1 from Figures 1 to 3 consists in the fact that this floor element 1 is equipped with unit-forming means 14 which are specially provided for producing a unit 4 between the aforementioned components 2-3. The unit-forming means 14 in question comprises, in the example, a layer 15 which is attached to or glued to the underside 16 of both components 2-3, such as a paper layer which is attached or glued to the underside 16 of at least one and preferably both components 2-3.

684 Although a unit 4 is brought between the two components 2-3 states by means of the aforementioned layer 15, the interaction of this layer 15 with the aforementioned coupling means 9A-10A allows the components 2-3 to occupy different mutual positions P1-P2. Moving to another position can take place by either unlocking or not unlocking the coupled sides 5A-6A of components 2-3. When changing the position, for example from the mutual position P1 from 1 to the mutual position P2 from 2, the unit 4 brought about by the unit-forming layer 15 can possibly be canceled by tearing this layer 15, for example at the broken line 17 shown, and the unit 4 is irrevocably lost, and / or by the fact that the glue connection of this layer 2-15 with the components 3 Either irrevocably dissolves or not. According to a variant of this embodiment (not shown), instead of using a unit-forming layer 15, it is also possible to work with unit-forming strips, which are then preferably located at several points in the longitudinal direction L of the components 2-3.

696 According to another variant, it is also possible for such layers or such strips to be on the top or decorative side 11 of the floor element 1. Such unit-forming means can then, for example, be removed after the floor covering has been installed and, in the case of a situation, still provide the additional advantage of protecting the decorative side 11 during the production, transport and installation of the floor elements.

701 The components shown in Figure 3 show the structure of a laminate flooring panel. For this purpose, they have a core 18 and a top layer 19 attached to it based on plastic. In particular, this relates to a laminate top layer which is manufactured using a DPL process and comprises both a so-called decor layer 20, which has a printed decor, and a protective, wear-resistant layer 21 over the decor, such as a so-called overlay. On the underside 16 of the components there is also a so-called backing layer 22, which also comprises plastic, such as a cured melamine resin.

I4F Exhibit 1003 - 241

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711 shows another possibility for the implementation of the unit-forming means 14. Here they consist at least of mechanical coupling means 9A-10A, which allow the components 2-3 of the same floor element 1 to interact with one another. These coupling means 9A-10A are designed differently from the mechanical coupling means 9-10, which the floor element 1 has on at least two opposite edges 5-6 and which allow two such floor elements 1 to be coupled to one another. In the example, the "different" is the coupling means 9A-10A, which is part of the unit-forming means 14 clearly from the difference in geometry between the coupling means 9-10 and the unit-forming coupling means 9A-10A the components 2-3 states and has a highest point, which is located in a horizontal plane H2, this plane H2 extending over the upright locking element 23 of the coupling means 10 of the floor element 10 located on the groove side 6.

722 The "different" nature of the unit-forming means 14 is also emphasized in this case by a difference in functionality. While the coupling means 9-10 of the floor element 1 allow these floor elements to be coupled both with a horizontal sliding movement S towards one another and with a pivoting movement W along their upper edges 24, the unit-forming means 14 from the example allow only a coupling by a pivoting movement W. It is clear from the foregoing that the unit-forming coupling means 9A-10A shown bring about a locking both in the horizontal H1 and in the vertical direction V1 of the components 2-3 states when the relevant components 2-3 are coupled.

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733 shows an example in which the unit-forming means 14 are formed by a separate fastening means 25, more specifically by a separate mechanical coupling part, which is clearly different from the coupling means 9-10, which allow the floor element itself to be coupled to other floor elements 1 of the same type.

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740 also shows that unit-forming means 14 can be selected which consist of at least one glue connection 26, which may be detachable and with which components 2-3 of one and the same floor element 1 are laterally attached to one another.

743 Such glue connection 26 can be applied at any point. As an alternative, the glue connection 26 is shown schematically. The glue connections 26-26A do not have to extend over the entire length of a component 23, but can be provided locally, possibly drop by drop, over this length.

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749 shows in perspective another floor element 1, the unit-forming means 14 being designed as a part 27 of the floor element 1, which can be located under the first component 2 as well as under the second component 3.

I4F Exhibit 1003 - 242

755 shows that this part 27 can be understood as a basic structure 28 on which each of the components 2-3 can be located.

757 This base structure 28 can for example consist of a sound-absorbing material, such as so-called HFD wood fiber board or polyethylene, or, as shown in FIG. 9, it can possibly comprise a sound-absorbing layer 29. Other effects can also be achieved on the basis of this basic structure 28. At least one of the components 2 is preferably firmly connected to the base structure 28, for example by gluing this component to the base structure 28, while at least one of the other components 3 lies freely on the aforementioned base structure 28. In this way the complexity of the floor element 1 is kept within limits, while a unit 4 with components 2-3 movable in relation to one another is obtained. Of course, in such a case the basic structure 28 moves together with the component 2 that is firmly connected to it. By firmly connecting at least one of the components 2 to a base structure 28 in any way, a floor element with increased rigidity is obtained, with all the beneficial effects thereof.

768 For example, such a floor element 1 will have a lower tendency to warp, which leads to increased ease of laying. It is noted that a permanent connection of a component to a basic structure can also be obtained by the fact that the component concerned is formed in one piece with the basic structure.

772 As already clearly emerged from FIGS. 1, 2 and 7, it is emphasized again with 10 that the components 23 of the floor elements according to the invention can also be provided with coupling means 30-31 on a second pair of opposite sides 7A-8A, which for example allow the components 2-3 of different floor elements 1 to be coupled to one another. In the example, this also applies to coupling means or coupling parts 30-31, with which locking can be obtained both in the horizontal direction H1 and in the vertical direction V1 on the relevant sides 7A-8A.

778 It is clear that according to a variant not shown, the coupling means 9 and 10, on the long sides 5-6 of the floor element, as well as the coupling means 9A-10A, can be designed differently than the coupling means 30 and 31 on the short sides of the floor element. In a practical embodiment of this, the coupling means 9-10 and / or 9A-10A are designed, for example, in such a way that the components can be joined together on their long sides exclusively by means of a pivoting movement and not by means of a sliding and latching movement, while the coupling means 30-31 can be joined together by means of a sliding movement. and allow locking movement.

786 11 reproduces a floor element according to the invention, wherein the aforementioned unit 4, which is brought about by the unit-forming means 14 states, consists at least in the fact that a first component 2 of the aforementioned components 2-3 extends to below another component 3 of the aforementioned components and in this case forms a basic structure 28 in this way. The dashed line 32 shows that it is not excluded that the basic structure 28 of the floor element 1 itself is provided with coupling means 9-10, which then allow the basic structures 28 of two such floor elements 1 to be coupled to one another.

793 12 shows another possibility, based on the floor element 1 of 11, how the floor elements 1 of

I4F Exhibit 1003 - 243

the invention can be coupled on their short side 7-8. For this purpose, at least the second component 3 as well as the basic structure 28 are provided with mechanical coupling parts 30-30A-31-31A, which per se only allow locking in the horizontal direction H1. As Fig. 13 shows, by the cooperation of the coupling means 30A-31A of the components 2-3 and the coupling means 30-31 of the basic structure 28 a locking in the vertical direction V1 can nevertheless be obtained. The vertical locking is brought about in that at least one of the components 3 in the floor covering extends over the edge 8 of the base structure. 14 also reproduces a similar embodiment, the coupling means 30A-31A of component 3 only allowing vertical locking.

802 15 shows a floor element 1 of the same type as that of 8 and 9. The components 2-3 are not constructed as laminate flooring panels, but at least one and in this case both components 2-3 of them are constructed as panels for so-called two-layer parquet (Dutch: tweelaagsparket; English: dual layer parquet). Such panels consist, as is known per se, for example, from essentially two layers of wood, namely on the one hand a surface layer 33 made of hard solid wood, which forms the decorative side 11, and on the other hand a core layer 34 made of soft wood. This embodiment of the invention is of particular interest to manufacturers of panels for two-layer parquet. Finally, for the production of the components 2-3 they can use their known production methods, while all they can do is provide a basic structure 28 to obtain the advantages of the present invention. In such a case, at least one of the components 2 is preferably firmly connected to the base structure 28, while at least one other component 3 lies freely on this base structure 28, but interacts or can cooperate with the firmly connected component 2.

815 Base structures 28 based on wood or ground wood, such as HFD wood fiber board, are preferred in embodiments with components 2-3 which are constructed as two-layer parquet panels.

818 16 shows that the core layer 34 of such two-layer parquet panels can be designed as a so-called lamellar core, which consists of several slats 34A-34B oriented in the transverse direction, which can for example consist of solid wood, such as wood that is softer than the aforementioned surface layer 33. Examples of wood that can be used for these slats are spruce or poplar. It is not excluded that a number or all of the aforementioned slats 34A-34B are made of a different, preferably wood-based, material. The slats34B, from which the coupling means 30-31 are formed in one piece, can for example consist of MDF or HDF. From WO 97/47834 it is now known that such fiberboard has ideal properties for forming coupling agents from it.

827 17 shows another important embodiment of a floor element 1 according to the invention, wherein the unit-forming means 14, besides a base structure 28, also comprise mechanical coupling means 9A-10A, which are different from the coupling means 9-10, which allow such floor elements 1 to be coupled to one another. The "different" nature of the unit-forming coupling means 9A-10A can mainly be reduced to the fact that they are made smaller in the case of the unit-forming means 14 shown. The difference in the distance D between the locking surface on the upright locking element 23-23A of the groove 10-10A and the upper edge 24 of the relevant component 2 or floor element 1 can be regarded as decisive for the difference in the dimensions between the coupling means 9-10 and 9A-10A. These distances

I4F Exhibit 1003 - 244

can behave like 5 to 4, for example. Preferably this ratio is greater than 3 or better still greater than 2 or even greater than one and a half.

838 18 shows how floor elements 1, such as those from FIG. 17, can be coupled together. This is possible, for example, by means of a horizontal sliding movement S, or by means of a pivoting movement W around the relevant edge 5-6. By coupling the floor elements 1, it can be ensured that the component 3, which lies freely on the base structure 28 of the floor element 1, is stretched between the first component 2 and the other floor element 1 coupled to this floor element 1.

844 19 shows a floor element 1 of the same type as the floor element 1 from 17, but with a different structure than a laminate floor panel. Both components 2-3 have a core 18 with a wood-based top layer 19 attached thereon. This can concern, for example, a veneer top ply, or, as is the case here, a wooden top ply 19 that is thicker than veneer. The core 18 of the floor element 1 can for example consist of soft wood, such as poplar or spruce wood, or be assembled. In the example, a backing layer 22 made of solid wood is attached to the underside 35 of the floor element 1 or the base structure 28. It is of course possible for such a backing layer 22 to be present in all of the components 2-3. It is noted that here, as was the case with Figures 15 and 16, at least one of the components 3 can be built up as a panel of so-called two-layer parquet and that the aforementioned core 18 can be composed of battens.

854 20 shows a variant of the floor element 1 from 19, the top layer 19 being made at least as thick as one of the aforementioned components 3. This embodiment is easy to manufacture. It is clear that a structure in which at least one of the components 3 consists exclusively of a top layer 19, either assembled or not, also has advantages if the top layer 19 is built up or assembled from materials other than wood.

859 Dashed line 36 in FIGS. 17 and 19 also shows that the basic structure 28 of such a floor element 1 can be composed of different parts 37 that are firmly connected to one another, for example glued. In this way it can be prevented that too much material loss occurs in the production of such flooring elements 1.

863 21 shows a locking system 38 for the lateral coupling of floor elements 1 by means of a pivoting and / or sliding movement, this locking system also having the features of the second aspect. Such a locking system 38 consists at least of coupling means 9-10, which are essentially designed as a tongue 9 on the side 5 of a first floor element 1 and a groove 10 delimited by a lower lip 39 and an upper lip 40 on the side 6 of a second floor element 1. These coupling means 9-10 are further provided with locking means 41. As shown here, these locking means 41 comprise a protruding locking element 23 on one of the aforementioned lips 39, in this case an upright locking element 23 on the lower lip 39, and a cooperating locking element 42 on the spring 9, in this case on the underside 43 of the spring 9.

872 21 and 22 show two mutual orientations O1-O2 which two floor elements 1 coupled by means of the aforementioned locking system 38 can adopt. The 22 and 23 each illustrate the mutual orientations from the 20 and 21. 21 and 23 show the same first mutual orientation O1, with the upper surfaces or decorative sides 11 of the floor elements 1 being mainly in the same plane and with surfaces 44-45 of the aforesaid locking elements 23-42 having parts 46-47 which come into contact with one another and which extend between a lower horizontal plane H3

I4F Exhibit 1003 - 245

and an upper horizontal plane H4. 22 and 24 represent the same second mutual orientation O2, with the upper surfaces or decorative sides 11 enclosing an angle A2 of less than 180 degrees and the aforementioned surfaces 44-45 being free of mutual contact. In addition, the part 46 of a first of these surfaces 44 that comes into contact in the first mutual orientation O1 extends in this second mutual orientation O2 above the aforementioned upper horizontal plane H4.

884 Also, the first and the second floor element 1 in the second mutual orientation O2 are still always locked to one another both in the vertical direction V1 and in the horizontal direction H1. It is noted that, inter alia, in the illustrated locking system 38, the floor elements 1 can be brought with a relative pivoting movement W about the coupled side from the first to the second mutual orientation O1-O2. It is further noted that mutual orientations with the properties of the aforementioned second mutual orientation O2 can preferably be assumed over a pivoting range of at least 5 degrees, and better still of at least 10 or at least 15 degrees. The fact that the horizontal and vertical locking can be maintained over such an area is particularly useful when installing floor elements 1 which are provided with such a locking system 38 on at least two opposite sides 5-6, and for components 2-3 of floor elements 1 which can cooperate by means of such a locking system 38.

895 From Fig. 23 it is clear that the lower lip 39 is in a bent position in the first mutual orientation O1. For comparison, the contour 48 of the lower lips 39 before coupling is shown in broken lines. Such a deflection can, for example, lead to a preload in the locking system 18, which is known per se from WO 97/47834. Whether or not we are talking about prestressing, it is preferred that the floor elements 1 are coupled without play in the aforementioned first mutual orientation O1, as is the case here.

901 From Fig. 24 it is clear that the surfaces 44-45 which make mutual contact in Fig. 23 are free of contact in the second mutual orientation O2. The part 46 which comes into contact in the first mutual orientation is now completely above the aforementioned upper horizontal plane H4. In this second mutual orientation O2, the lower lip 39 is less deformed than in the first mutual orientation O1. As shown, the lip 39 has completely returned to the position 48 it occupied before the floor elements 1 were coupled. It is also possible that in the second mutual position O2 there is a clearance 50 between the coupled sides. Such a position is shown in broken line 49 in Fig. 24. This clearance 50 has the consequence that the floor elements 1 can move over a certain distance in the horizontal direction H1. In the example, however, the resulting movement space is so small that the aforementioned locking in the vertical direction V1 and the horizontal direction H1 is maintained over the entire range of possible movement.

912 It is of course possible that the floor elements 1 can also adopt other mutual orientations than orientations with the properties of the aforementioned first or second mutual orientation O1-O2, such as the third mutual orientation mentioned in the introduction in this context, whereby a backlash-free locking is preferably achieved and / or the aforementioned lower lip is elastically deformed again.

917 25 shows a locking system 38 for the lateral coupling of floor elements 1 to one another by means of a pivoting and / or sliding movement, but with the features of the third aspect of the invention. It is clear from the figure that the locking system 38 is constructed globally in the

I4F Exhibit 1003 - 246

same way as the locking system of FIG. Furthermore, the locking system 38 is constructed in such a way that the lower lip 39 is elastically deformed in the normal position of use of the floor elements 1, namely the position in which the upper surfaces or decorative sides 11 are essentially in the same plane. The special feature of the locking system 38 reproduced here is that the lower lip 39 undergoes at least three successive changes when the first and second floor element 1 is uncoupled by means of a pivoting movement W.

926 The lower lip 39 undergoes a first change when the floor element 1 is brought from the orientation shown in FIG. 25 into the orientation shown in FIG. The change here consists in a decrease in the elastic deformation, in the present case the deflection, of the lower lip39.

929 The second change takes place when the floor element is swiveled out further into the orientation shown in FIG. This second change. is an increase in the elastic deformation or deflection of the lower lip 39.

932 The third change manifests itself when the floor element 1 is pivoted completely out of the other floor element from the orientation shown in FIG. This third and in the example last change then again consists of a decrease in the elastic deformation or deflection of the lower lip 39.

935 28 to 30 show on a larger scale the deformation, bending or displacement of the lower lip 39 in the vicinity of its distal end 51 for the mutual orientations of the floor elements 1, which are shown in FIGS. 25 to 27, respectively.

938 By comparison with the contour 48 of the lower lip 39 for coupling the floor elements 1 shown in broken lines, it is clear from FIGS Position or bend comparable to the bend in Fig. 28. It is not excluded, however, that the deflection that is achieved after the second change is smaller or larger than that which is present in the normal use position. It is noted that normal values for the displacement of the lower lip 39 near its distal end can vary between a few hundredths and a few tenths of a millimeter.

944 It is clear to a person skilled in the art how the embodiments of floor elements 1 according to the first aspect of FIGS. 1 to 20 can be extended to and how the locking systems 38 of FIGS. 21 to 30 can be used in floor elements 1 with more than two components 2-3, for example with the intention of forming improved three-, four- or multi-plank elements.

948 In general, such embodiments have the features that, starting from three or more components 2-3, using one or more unit-forming means 14, for example using a base structure 28, a unit 4 is brought into being, with at least one of these components 3, and preferably at least two, and even better all components in With regard to all other components 2 of this floor element 1 can assume different positions P1-P2. It is further preferred that each of these components 2-3 has a decorative side 11 which is located on the upper side of the floor element 1. As an example, some possible embodiments and their application are listed in FIGS. 31 to 40 and 45 to 48.

955 31 shows a floor element according to the present invention, similar to the embodiment of 8, 9 or 15. Where an improved two-plank element was aimed at with the floor element 1 from FIGS. 8, 9 or 15, the floor element 1 from 31 aims at an improved three-plank element. For this purpose, the floor element thus also comprises three components 2-3-52, each of which has a decorative side 11. Based on these three components 2-3-52, a unit 4 is formed with the aid of a unit-forming means 14, in this case a basic structure 28. At least one of these ingredients 2-3-52, and preferably all ingredients 2-3-52, can occupy different positions with respect to all

I4F Exhibit 1003 - 247

other ingredients. At least one of the components 2 is preferably firmly connected to the base structure 28, while at least one of the remaining and preferably both of the remaining components 3-52 lie freely on the base structure 28.

965 32 Fig. 16 also shows an embodiment, but now similar to that of Fig. 17, which can result in an improved three-plank element. Here, the unit-forming means 14 consists of a part 27 of the first component 2 which extends at least below both other components 3-52.

968 33also relates to an embodiment which can result in an improved three-plank element, but is composed only of two components 2-3 which can occupy different positions in relation to one another.

971 34 shows two examples of floor elements 1 with the features of the first aspect, wherein a unit 4 is brought about by means of four components 2-3-52-53. The unit-forming means 14 here relates to a basic structure28, which extends or can extend at least under all components 2-3-52-53. In addition to the depicted mutual positions P2 of the components 2-3-52-53, mutual positions P1 can also be assumed, the floor element 1 having a globally rectangular, and in this case square, shape. In the example, both the base structure 28 and the components 2-3-52-53 have coupling means 9-9A-10-10A on two pairs of opposite edges or sides, preferably this relates to coupling means that allow at least one horizontal or one vertical locking, and even better allow both. It is noted that it is not excluded that only one of the two, the basic structure 28 or the components 2-3-52-53, has such coupling means.

981 It is also not excluded that the coupling means are provided on only two opposite sides of the basic structure and / or the components. Likewise, a vertical as well as a horizontal locking with other similar floor elements 1 in the floor covering is preferably achieved between such floor elements 1 in their entirety, with the aid of the coupling means present thereon.

985 The difference between the two floor elements 1 shown in FIG. 34 lies in the fact that the coupling means 9A-10A in the second floor element 1 shown on the right are arranged in a mirrored sequence around parts 2-3-52-53 compared to the first floor element 1 shown on the left. The coupling means 9-10 which are present on the basic structure 28 are, however, ordered in the same sequence. As is known, for example from WO 2004/063491, a floor covering with a herringbone motif can be formed on the basis of floor elements which have a mutually mirrored arrangement of the coupling means. As can be seen from WO 2005/098163, however, this property is not a necessary condition for forming a herringbone motif.

993 35 shows that the floor elements 1 from 34 can also be used to form a floor covering 54 such that other motifs, such as the block motif from 36, can also be formed. This block motif is achieved simply by applying the components 2-3-52-53 in the mutual position P1, wherein the flooring elements 1 have a globally rectangular shape, and in this case square shape.

997 It is noted that, in the event that at least one of the components 2 is firmly connected to the base structure 28, either by means of a glue or adhesive connection, or by the fact that the component 2 in question is at least partially formed in one piece with the base structure 28, or by means of mechanical coupling means, or by one Combination of the above possibilities, a good connection in the floor covering 54 can already be obtained with the aid of the coupling means 9-10 of the base structure 28, since in such a case there can be zones 55 of mutually connected components which are connected to one another by means of the coupling means

I4F Exhibit 1003 - 248

9-10 of the base structure 28. These zones 55 are illustrated in FIG. 35 with the aid of hatched components. Such zones 55 are also obtained in the case of a block motif shown in FIG. In cases where the base structure 28 on both pairs of opposite sides 5-6-7-8 have coupling means 9-10 which allow both a horizontal and vertical interlock to be formed with a similar base structure 28, the coupling means 9A-10A of the components 2-3-52-53 can be on one pair or on both Pairs of sides 5A-6A-7A-8A can be limited to coupling means which, for example, only allow horizontal or only vertical locking.

1011 It is even possible, for example, to omit the coupling means 9A-10A on the short pair of sides 7A-8A or on the long pair of sides 5A-6A of the components 2-3-52-53. Even if the coupling means 9A-10A of the components 2-3-52-53 are restricted to a minimum, a very good floor covering 54 is still obtained using the coupling means 9-10 of the base structure 28, since the components 2-3-52-53, which lie free on the base structure 28, are between the zones 55 or in other words between the components 2, which are firmly connected to this basic structure 28, are stuck.

1018 37 gives another example of floor elements 1 with the features of the first aspect that can be used to form a floor covering 54 with a herringbone motif. The special feature of this embodiment is that the components 2-3-52-53 are not aligned with their longitudinal direction L according to the basic structure 28, but rather form an angle of 45 degrees in this case with the main directions of the basic structure 28. This embodiment offers the advantage that a floor covering 54 with a herringbone motif can be put together in a simple manner using such floor elements 1. By aligning the main directions of the base structure 28 with the walls of the room in which the flooring 54 is to be installed, it is obtained that the herringbone motif is also aligned with these walls.

1027 38 shows an example in which a unit 4 is also brought about by means of unit-forming means 14, in this case using a base structure 28 or base plate. As is clear from the figure, the components 2-3-52 can occupy at least two different mutual positions P1-P2. Namely, on the one hand, a first mutual position P1, which is illustrated using the floor element 1 shown on the left in the figure, in which the floor element 1 has a globally rectangular shape, and on the other hand at least one second mutual position P2, which is illustrated using the floor element 1 shown on the right in the figure. The floor elements 1 can be used both in the opposite position P1 of the components 2-3-52 shown on the left as well as in the right-hand side for assembling a floor covering 54. 39 shows an example of a floor covering 54 which is assembled on the basis of these floor elements 1. FIG. It is clear that use is made here of the configuration of the components 2-3-52 shown on the right in FIG.

1038 40shows another example of a floor element 1 according to the invention, wherein the components 2-3-51, as indicated by the arrows, can be shifted in the longitudinal direction and widthwise direction.

1041 41 shows thematically a step in a method for assembling floor elements 1 into a floor covering 54. This is based on floor elements 1 which include at least a first component 2 and a second component 3. In the present case, floor elements 1 are assumed to be of the two-plank type and a unit 4 based on at least the aforementioned components 2-3 can be created using unit-forming means 14, in this case a base structure 28 which is made in one piece or is

I4F Exhibit 1003 - 249

otherwise firmly connected to a part of the first component 2. The step in the method shown in FIG. 41 relates to the introduction of the first component 2, in this case including the base structure 28 firmly connected thereto, in the plane of the floor covering 54. This first step preferably also comprises the coupling of the floor elements 1 with floor elements 1 already present in the floor covering 54 by means of mechanical coupling means 9-10 which are present on at least one pair 5-6 and preferably two pairs of opposite edges 5-6-7-8 of the floor elements 1.

1053 This coupling can take place in a manner known per se. For example, the laying methods known from WO 94/26999, WO 01/02671 and WO 2006/125646 can be used for this purpose.

1056 42 Figure 3 illustrates a further step in this method, which hereby has the features of the aforementioned first possible method. According to the example, this step can at least consist in bringing about such a unit 4 or such a floor element 1 starting from a first component 2 and a second component 3 and in the final position in the floor covering 54 attaching both the first component 2 and the second component 3. In this case, the relevant unit 4 is brought into a state by attaching the second component 3 to the base structure 28 of such a floor element 1. It is clear that there need not be a clear relationship between the first component 2 and the second component 3. This means, for example, that a first component 2 and a second component 3, which were packaged together and possibly formed a unit 4 in the packaging, do not necessarily also have to form a unit 4 in the floor covering 54.

1066 It is finally possible that, in their respective final position in the floor covering 54, they form such a unit 4 with other similar first components 2 or second components 3.

1068 It is noted that in the example of FIGS. 40 and 41, the first component 2 had already been brought into its final position in the previous step described with the aid of FIG.

1070 Figures 42 and 43 illustrate sequential steps in a preferred embodiment of such a method. Here, the aforementioned first component 2 and second component 3, as illustrated in FIG. 43, are applied as a unit 4, that is, together, in the floor covering 54, after which, as FIG. 44 shows, the aforementioned unit 4 is changed to reach their respective positions. Changing the unit 4 in this case means changing the mutual position of the second component 3 in relation to the first component 2. As discussed in the introduction and in the preceding part of the detailed description, such a change in the mutual position P1-P2 can be achieved in a number of ways. For this purpose, the aforementioned unit 4 can either be temporarily canceled or not canceled. A possible change is indicated in 44 by means of the arrow 56 and includes at least one sliding movement along the first component 2. Here, the second component 3 is possibly in an orientation pivoted with respect to the first component 2.

1081 It is noted that, inter alia, in this case the application of a locking system 38 having the features of the second and / or the third aspect can usefully be used for coupling the components 2-3 together.

1084 It is further noted that both in the example of FIGS. 40 and 41 as well as in the example of FIGS. 42 and 43 the unit-forming means 14 are active in the respective final positions of the components 2-3 in the floor covering. This means that a unit 4 between at least a first component 2 and a second component 3 also exists in the final floor covering 54.

I4F Exhibit 1003 - 250

1088 It is clear that Figures 42 and 43 also illustrate a method having the features of the second possible method mentioned in the introduction. For this purpose, at least the aforementioned first component 2 and the aforementioned second component 3 are applied together in a mutual starting position P1 in the plane of the floor covering 54. Then the components 2-3 are brought out of this mutual starting position P1 and into their respective final mutual position P2 in the floor covering 54. Here, the aforementioned first component 2 reaches its final position earlier than the aforementioned second component 3 in the example.

1095 It is clear that each of the aforementioned components 2-3 of the floor elements 1, with which the floor covering 54 is put together according to FIGS. 41 to 43, can be provided with a decorative side 11 which, in the final position of the relevant component 2-3 in the floor covering 54, is intended to form part of the floor surface. In such a case, as here, a floor covering 54 can be obtained which reproduces rows 12 of decorative parts 13, this floor covering 54 comprising at least a first row 57 of decorative parts 13, which is preferably formed exclusively by first components 2, and also comprises at least one second row 58 of decorative parts 13, which is preferably formed exclusively by second components 3, wherein the aforementioned first row 57 and above The above-mentioned second row58 lie next to each other on the side. In the example of the figures, such a first row 57 is alternated with such a second row 58.

1106 Of course, with the aforementioned first and second possible methods, other floor coverings 54 can also be obtained, such as the floor coverings illustrated with reference to FIGS. 35 and 39, for example. The method is illustrated schematically with the aid of the arrows in FIG.

1109 In general, and with reference to Figure 1, it is noted that the aforementioned components 2-3-52-53 preferably have a width B which is significantly greater than the thickness T of the component 2-3-52-53 concerned. Even better, the width B is greater than two or three times the thickness T of component 2-3-52-53. A preferred width B is, for example, between five and 10 centimeters, and is even better greater than 6 centimeters.

1114 45 shows an example in which the width B of the components 2-3-52-53 is less than one tenth, in this case even less than one twentieth of the length L1 of the components, and / or has the same width B in relation to the length of the possible base structure 28. In a particularly useful embodiment, the components 2-3-52-53 have a width B between 5 and 8 centimeters, or better still between 6 and 7 centimeters, while this component and / or the possible base structure 28 has a length L1 which is greater than 1 meter, and better is even taller than four feet. A unit 4 is preferably formed on the basis of three or more of these components, at least one and preferably only one of these components 2 being firmly connected to the base structure 28. In this way an optimal ratio is achieved between the manageability of the unit 4 and the dimensions of the components 2-3-52-53, with which a floor covering that is very pleasant for the user can be put together.

1125 In each example, four components 2-3-52-53 are used, each of which may or may not represent a plurality of decorative parts 13. It is clear that the components 2-3-52-53 of the floor element 1 in the figure, besides the mutual position P2 which is shown, can also assume at least one mutual position P1, shown in broken lines, in which the overall shape of the floor element is rectangular and elongated. It is also clear that the floor element shown can mean

I4F Exhibit 1003 - 251

an improvement of a so-called four-plank element.

1131 As 46 shows, the components 2-3-52-53 per se and / or the floor elements 1 on one or more upper edges 24 can have chamfers 59 or imitation chamfers 59A. Chamfers 59-59A and methods of applying or making them are now well known for application to various types of floor elements and floor panels. As an example, reference is made to WO 01/96688, where such chamfers for laminate floor panels are presented.

1136 21, 25 and 26 of the present application give examples of a chamfer 59. In this case, this concerns a chamfer 59 of the upper edges 24 in the form of a bevel. In the case of components in the form of a laminate panel, chamfers can be applied by a variety of techniques. For example, they can only be depicted in the printed decor, they can be formed by removing material from the relevant upper edge, they can be formed by an impression, and the like. In the case where they are formed by removing material from the relevant upper edge, a separate decorative layer is preferably provided on the bevel.

1143 47 shows an example in which the components 2-3 on the upper edge 24 at least on both sides 5A-6A of a first pair of opposite sides, and preferably, but not shown here, also on the second pair of opposite sides 7A-8A, are provided with a chamfer 59, which is formed by removing material . The surface 60 formed in this way extends, as shown, preferably through the top layer 19 and the core material or the core 18 of the relevant component 2-3. However, it cannot be ruled out that such chamfering59 will remain limited to the aforementioned prime location19. Although the component shown here is constructed like a laminate panel of the DPL type, it is not excluded that such chamfers 59 are used in other of the aforementioned possible top layers 19. This technique can also be particularly useful, for example, with top plies made of veneer. The surface 60 formed by removing the material is provided with a separate decorative layer 61, for example in the form of a hardened substance such as varnish, ink or the like, or in the form of an imprint applied by means of transfer printing.

1155 If the decorative sides 11 of the components 2-3, as is the case, inter alia, in FIGS. 1, 2, 7, 45 and 46 represent a row 12 of two or more decorative parts 13, a chamfer 59 or imitation chamfer 59 A using whatever technique can be provided on the transition 62 between these decorative parts 13. In the event that the components are constructed like laminate panels, the techniques mentioned above can again be used.

1160 48 shows an example in which an imitation chamfer 59A is applied to such a transition 62 by means of an impression 63 of the top layer 19 and possibly of the underlying core material 18. It is noted that, as is known, inter alia, from WO 2006/066776, a pressing element can be used for making such an impression 63. In the case of a component 2 that is constructed like a laminate panel, the impression 63 can be applied with the pressing element used for the molding of the top layer 19. It goes without saying that the components 2-3-51-53 can also have other recesses in the upper surface or decorative side 11, either in the form of impressions or not. For example, in the case of components 2-3 constructed like laminate panels, techniques for creating impressions that mimic a wood structure can be used. Such techniques are known, for example, from WO 2001/096689 or the above-mentioned WO 2006/066776. 46 further shows that the short sides 7A-8A of the components 3-52-53 can also be provided with a chamfer 59.

I4F Exhibit 1003 - 252

1172 In the example shown, this concerns a chamfer 59 which is obtained by removing material and providing a separate clothing 61 on the surface 60 obtained.

1174 In general, it is noted that chamfers 59 or imitation chamfers 59A, due to the fact that a unit 4 is formed from components 2-3 in floor elements 1, can be provided in many respects more easily according to the invention than in floor elements of the prior art.

1177 As previously reported, in the case of floor elements 1, such as the one shown in FIGS. 45 to 48, preferably at least one of the components 2 is permanently connected to the base structure 28, for example by means of a glue connection 64, which is shown schematically as a line piece in FIG. 47 as an example.

1181 It is noted that in the case that the basic structure consists of a plate, for example as in figures 7-10, 15-16, 20, 31, 34-40 and 45-48, such embodiment can also be defined as constituting a floor element with the feature that it comprises at least one base structure formed by a plate, as well as at least two components which can be coupled to one another at their edges and which each consist of a floor panel, at least a first component of which is fixedly attached to the base plate, while at least a second of the aforementioned components is movable and so that it can take various positions with respect to the first component. Of course, the invention then also relates to all embodiments that fall under this independent portrait definition. It is also clear that the invention also relates to embodiments which fulfill the aforementioned portrait definition and which further have one or more additional subordinate features which have been described with reference to the preceding embodiments.

1192 It is further noted that where there is talk of a component that lies freely on a base structure, "free" is meant in the cases that this component 3 can be relocated or displaced with respect to the base structure 28 and any temporary fastening means, such as a detachable one Glued connection, between the component 3 and the basic structure cannot be excluded. It is also not excluded that components 3 that can be displaced with respect to a base structure 28, such as a plate, are fixedly connected in their final position to the base structure, for example by means of a glue connection.

1199 With regard to the base structures 28 or base plates shown in the figures, for example in FIGS. 15 and 45, it is noted that they are not bound to a specific thickness, but rather can be made both thicker and thinner than shown in relation to the components 2-3.

1202 49 represents another possible locking system that can be used, for example, on the sides, in particular on the long sides 5-6, of the components of a floor element 1 according to the invention. In particular, the coupling means shown are suitable for use on the long sides 5-6 of floor elements 1 of the type shown in FIG. The coupling means essentially consist of a spring 9A and a groove 10A which are provided with locking means 41 so that when two floor elements 1 or their components 2-3 are coupled, both a horizontal and a vertical locking occurs between the respective sides of the floor elements or components. The coupling means 41 reproduced here allow the spring 9A to be brought into the groove 10A at least with a pivoting movement W around the upper edges 24. In the illustrated case, such pivoting movement W is the only movement with which the coupling means can be fitted into one another. The broken line shows that the tongue panel 3 must be pivoted up relatively high before the connection is completely released, which allows a slightly pivoted up tongue panel

I4F Exhibit 1003 - 253

3 to be pushed in the longitudinal direction L of the groove 10A along the relevant sides without the connection being completely released.

1216 It is understood that this property is particularly interesting for achieving a smooth installation of the components 2-3 in the floor elements 1 of the present invention according to some preferred embodiments thereof.

1219 A special, not shown variant of a floor element according to the first aspect of the invention relates to a floor element, wherein at least one of the aforementioned components is composed of several elements. In the example of 1, 7 or 45, it could be, for example, that a component 2, which reproduces a series 12 of decorative parts 13, is composed of elements, each of which reproduces only one decorative part, for example. These elements may or may not be releasably connected to one another to form the component concerned. For example, they can be connected, preferably releasably, by means of mechanical coupling means which bring about both vertical and horizontal locking between the elements. Such coupling agents can be of the type shown in Figures 3-6. Preferably, such elements should have a mutually different length or should have a different length in comparison with other elements which are intended to be incorporated into the same floor covering.

1230 For example, you can work with three different lengths. Finally, it is known from US Pat.

1231 According to another variant, not shown, of the first aspect of the invention, the components of one and the same floor element have at least one pair of coupling means which allow coupling in the horizontal and vertical directions by means of a downward movement. Such coupling is better known as a "push lock" is known per se, for example from WO 00/47841.

1235 Yet another variant is shown in FIG. In this example, the components 2-3 of one and the same floor element 1 have at least one pair of coupling means which allow a coupling in the horizontal direction H1 by means of a downward movement N without there being any mention of a vertical connection. Such coupling is better known as a "drop" or tilt connection and in the flooring elements 1 of the present invention can preferably be applied to the short sides 7A-8A of the components 2-3. The example shown here for such a drop connection also has the special property that the male coupling part 30A can be attached to the female coupling part 31A not only with a downward movement N, but also with a horizontal sliding movement S. This property allows the individual parts 2-3, preferably on their short sides 7A-8A, to be easily fitted into one another, even in places that are difficult to reach, such as under overhanging cupboards and radiators.

1246 In such a case, the component in question 2-3 is preferably guided on its long sides 5-6 in that it is already connected to adjacent components 2-3.

1248 50 also clearly shows with the aid of the arrow 65 that an elastic deformation of the female coupling part 31A preferably takes place at least when the aforementioned horizontal sliding movement S is carried out. It cannot be ruled out that in the coupled state of the male coupling part 30A and the female coupling part 31 there is still always a bending of the relevant part of the female coupling part 31A.

1253 The coupling means reproduced in Fig. 50 can also be used with other floor elements 1 than with floor elements 1 which have the features of the first aspect and / or the aforementioned portrait definition. They can be used particularly favorably in the case of narrow panels such

I4F Exhibit 1003 - 254

as laminate panels, for example in panels with a width B which is less than 16 centimeters, preferably less than 10 or even less than 8 centimeters. It is clear that the coupling means shown here form a locking system with the features of the fourth aspect of the present invention mentioned in the introduction.

1260 The present invention is in no way restricted to the embodiments described as an example and shown in the figures, but such floor elements can be realized according to various variants without departing from the scope of the invention.

I4F Exhibit 1003 - 255

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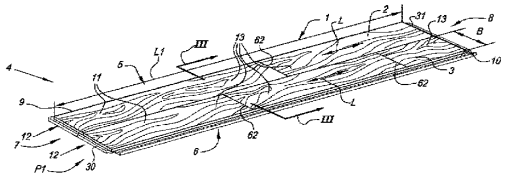
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Die folgenden Angaben sind den vom Anmelder eingereichten Unterlagen entnommen

(54) Bezeichnung: **Fußbodenelement und aus solchen Fußbodenelementen bestehender Fußbodenbelag**

(57) Hauptanspruch: Fußbodenelement des Typs, der an mindestens zwei gegenüberliegenden Kanten (5-6) Koppelmittel (9-10) aufweist, die gestatten, dass zwei solcher Fußbodenelemente (1) an den betreffenden Kanten (5-6) miteinander zusammenwirken können, dadurch gekennzeichnet, dass das Fußbodenelement (1) mindestens zwei Bestandteile (2-3) umfasst, sowie mindestens einheitsbildende Mittel (14) umfasst, die, ausgehend von den vorgenannten Bestandteilen (2-3) eine Einheit (4) zustande bringen können, wobei die vorgenannten Bestandteile (2-3) mindestens zwei gegenseitige Positionen (P1-P2) einnehmen können, entweder mittels oder nicht mittels Aufhebung der durch die vorgenannten einheitsbildenden Mittel (14) zustande gebrachten Einheit (4).



Beschreibung

[0001] Diese Erfindung betrifft Fußbodenelemente, sowie Fußbodenbeläge, die aus solchen Fußbodenelementen zusammengestellt sind. Die Erfindung betrifft auch Verriegelungssysteme, die in den vorgenannten Fußbodenelementen angewendet werden können.

[0002] Spezieller betrifft die Erfindung Fußbodenelemente, die dazu gedacht sind, einen schwimmenden Fußbodenbelag zu bilden, und die beim Verlegen an ihren Kanten mittels mechanischer Koppelteile, die entweder einteilig mit dem Fußbodenelement ausgeführt sind oder nicht, miteinander gekoppelt werden können. Solche Koppelteile können so ausgeführt sein, dass sie sowohl in horizontaler als auch in vertikaler Richtung eine gegenseitige Verriegelung der Fußbodenelemente vorsehen, beispielsweise wie in den internationalen Patentanmeldungen WO 94/26999, WO 97/47834, WO 01/98603 und WO 01/96688 beschrieben.

[0003] Zur Erhöhung des Verlegekomforts solcher Fußbodenelemente wird meistens danach gestrebt, sie mit relativ großen Abmessungen auszuführen. Große Fußbodenelemente sind nämlich durch den Benutzer praktischer zu verarbeiten, und das Zusammenstellen eines Fußbodenbelags erfordert weniger Zeit, wenn der Benutzer von großen Fußbodenelementen ausgehen kann. Im Zusammenhang mit der geringeren Verlegezeit sind auch die Verlegekosten eines solchen Fußbodenbelags geringer. Mit „großen Fußbodenelementen" sind hauptsächlich Fußbodenelemente mit einer solchen Größe gemeint, dass sie noch einfach durch eine einzige Person gehandhabt werden können. Typische Abmessungen solcher Fußbodenelemente sind beispielsweise 1200 mal 200 Millimeter.

[0004] Im Widerspruch zu dem vorgenannten Bestreben steht die Tatsache, dass kleinere Fußbodenelemente oder Fußbodenelemente mit kleineren, beispielsweise weniger breiten, Zierteilen, insbesondere, wenn es sich um Holzparkette oder Parkettimitationen handelt, vom ästhetischen Gesichtspunkt aus sehr begehrt sind. Es ist noch anzumerken, dass, obwohl kleinere hölzerne Fußbodenelemente in Hinblick auf Materialkosten pro Einheitenoberfläche billiger sind als große hölzerne Fußbodenelemente, die größeren Verlegekosten bei kleineren Fußbodenelementen dafür sorgen, dass sie, wenn die Gesamtkosten des Fußbodenbelags in Rechnung gestellt werden, teurer ausfallen als ein aus großen hölzernen Fußbodenelementen zusammengestellter Fußbodenbelag. Außerdem weisen lange, schmale Fußbodenelemente die Neigung auf, sich um eine Achse lotrecht auf ihre Zierseite zu krümmen, was beim Verlegen solcher Fußbodenelemente Probleme ergibt. Diese Probleme sind sehr deutlich, wenn die Fußbodenelemente leimlos, das heißt, beispielsweise anhand mechanischer Koppelmittel, verlegt werden, da die vorgenannte Krümmung zu Schwierigkeiten beim Ineinanderfügen der Koppelmittel führt. Beim Verlegen mit Leim müssen bei Krümmung der Fußbodenelemente die bereits verlegten Fußbodenelemente mit speziell dafür entworfenen Spannwerkzeugen stark angespannt werden, welche letzteren an sich bekannt sind, beispielsweise aus WO 99/01629.

[0005] Um eine Lösung für die obengenannten Widersprüche und Probleme zu bieten, bestehen im Stand der Technik rechteckige Fußbodenelemente, die an sich mehrere Zierteile umfassen. Bekannte Beispiele hiervon sind Fußbodenelemente, die mindestens zwei nebeneinanderliegende hölzerne Zierteile oder Reihen hölzerner Zierteile umfassen oder wiedergeben. Je nach der Anzahl solcher Reihen werden sie Zweiplanken-, Dreiplanken- oder Vierplankenelemente genannt. Für Beispiele dieser Lösung aus dem Stand der Technik wird auf GB 2 085 357 und WO 93/01378 verwiesen.

[0006] Die hierin vorangehend beschriebenen rechteckigen Fußbodenelemente aus dem Stand der Technik haben den Nachteil, dass es unmöglich ist, um davon ausgehend einen Fußbodenbelag mit einem Wildverband von Zierteilen zusammenzustellen, da die Zierteile aus jeweils zwei oder mehr nebeneinanderliegenden Reihen, je nachdem, ob ein Zweiplanken- beziehungsweise ein Mehrplankenelement betroffen ist, in Längsrichtung der betreffenden Reihen an der Kante des einen Fußbodenelements notwendigerweise gleichzeitig in Zierteile eines anderen Fußbodenelements in dem Fußbodenbelag übergehen. Das Fehlen von Wildverband in einem solchen Fußbodenbelag wird als störend empfunden.

[0007] Der Stand der Technik umfasst verschiedene Vorschläge zur Verbesserung von Zwei- oder Mehrplankenelementen.

[0008] Das obengenannte WO 93/01378 schlägt beispielsweise vor, die Zierteile an den einander gegenüberliegenden kurzen Seiten der rechteckigen Fußbodenelemente aufeinander abzustimmen, sodass die Motive von in Längsrichtung aneinandergrenzenden Zierteilen ineinander übergehen, wo die kurzen Seiten zweier Fußbodenelemente aneinandergrenzen. Es ist deutlich, dass diese Technik nur auf Fußbodenelemente mit künstlich erhaltenen Zierteilen angewendet werden kann, wie etwa Zierteilen, die ein gedrucktes Dekor umfassen. Außerdem ist die Anpassung des gedruckten Dekors zur Erzielung einer derartigen Übereinstimmung zeitaufwendig und bedeutet eine große Einschränkung der Gestaltungsfreiheit. Außerdem wird das Fehlen von Wildverband noch stets auffallen, wenn beispielsweise minimale Höhenunterschiede zwischen den verschiedenen Fußbodenelementen vorliegen.

I4F Exhibit 1003 - 257

[0009] In JP 07-076923, EP 1 103 672 und US 4,953,335 wird vorgeschlagen, die verschiedenen Reihen von Zierteilen alle gleich lang auszuführen, jedoch an einem festen Platz in Längsrichtung in Bezug zueinander verschoben in das Fußbodenelement aufzunehmen. Die auf diese Weise erhaltenen Fußbodenelemente sind nicht mehr rechteckig, sondern weisen ein Paar treppenförmige gegenüberliegende Seiten auf. Dieser Vorschlag zur Verbesserung von Zwei- oder Mehrplankenelementen weist noch stets eine Anzahl Nachteile auf. Erstens wird der Verband, der anhand derartiger Fußbodenelemente erhalten werden kann, noch immer keinen echten Wildverband betreffen, da jeweils dieselbe Treppenvorm in dem Fußbodenbelag erkennbar sein würde, und zweitens sind die vorgeschlagenen Fußbodenelemente aufgrund ihrer Treppenform schwierig zu verpacken.

[0010] Die vorliegende Erfindung bezweckt in erster Linie ein alternatives und/oder verbessertes Fußbodenelement, womit ein gegebenenfalls schwimmender Fußbodenbelag gebildet werden kann, wobei dieses Fußbodenelement gleichzeitig zu einem erhöhten Verlege- oder Installationskomfort und/oder zu neuen Verlege- oder Installationsmöglichkeiten führen kann. Zweitens bezweckt die Erfindung gemäß verschiedener ihrer bevorzugten Ausführungsformen ein Fußbodenelement, das mindestens einem der vorerwähnten Probleme, Nachteile oder Widersprüchlichkeiten aus dem Stand der Technik entgegentreten kann. Hierzu betrifft die Erfindung gemäß ihren ersten Aspekt ein Fußbodenelement des Typs, der an mindestens zwei gegenüberliegenden Kanten Koppelmittel oder Koppelteile aufweist, die gestatten, dass zwei derartige Fußbodenelemente an den betreffenden Kanten miteinander zusammenwirken können, mit dem Merkmal, dass das Fußbodenelement mindestens zwei Bestandteile umfasst, sowie mindestens einheitsbildende Mittel umfasst, die, ausgehend von den vorgenannten Bestandteilen, eine Einheit zustande bringen können, wobei die vorgenannten Bestandteile mindestens zwei gegenseitige Positionen einnehmen können, entweder mittels oder nicht mittels Aufhebung der durch die vorgenannten Mittel zustande gebrachten Einheit. Es ist deutlich, dass mehrere solcher Fußbodenelemente zur Bildung eines Fußbodenbelags verwendet werden können.

[0011] Wie erwähnt, sind mit „einheitsbildenden Mitteln" Mittel oder Teile gemeint, die gestatten, dass ausgehend von den vorgenannten Bestandteilen eine Einheit gebildet werden kann. Das sind Mittel, die speziell zur Bildung einer solchen Einheit vorgesehen sind, wobei unter einer Einheit die kleinstmögliche Gruppe von Bestandteilen verstanden wird, die als Fußbodenelement mit gleichen oder gleichartigen Einheiten oder Fußbodenelementen zusammenwirken kann, mit der Absicht, einen Fußbodenbelag zu bilden. Es ist deutlich, dass im Rahmen der vorliegenden Erfindung die betreffenden Einheiten stets zwei oder mehr solcher Bestandteile umfassen sollen. Außerdem ist es deutlich, dass der Begriff Einheit sich nicht auf zwei oder mehr Fußbodenpaneele bezieht, die nur auf an sich, beispielsweise aus WO 97/46834, bekannte Weise miteinander gekoppelt sind, oder die spezieller nur anhand eines an mindestens zwei gegenüberliegenden Seiten jedes Fußbodenpaneels vorhandenen identischen Paars komplementärer Koppelmittel gekoppelt sind. Die einheitsbildenden Mittel der Erfindung betreffen vielmehr Vorrichtungen, die separat von den an dem Fußbodenelementen und/oder an jedem der betreffenden Bestandteile vorhandenen identischen Paaren komplementärer Koppelmittel ausgeführt sind. Es ist deutlich, dass es gemäß der vorliegenden Erfindung nicht ausgeschlossen ist, dass, außer dem Vorhandensein solcher identischer Paare komplementärer Koppelmittel oder Koppelteile an jedem Bestandteil, auch ein separates einheitsbildendes Mittel an dem Fußbodenelement vorgesehen ist. Für Beispiele solcher Ausführungsformen wird auf die weitere Einleitung und die detaillierte Beschreibung verwiesen.

[0012] Es wird angemerkt, dass die Einheiten oder Fußbodenelemente, die gemäß der vorliegenden Erfindung ausgehend von den Bestandteilen gebildet werden, vorzugsweise Abmessungen aufweisen, die von einer Person einfach gehandhabt werden können. Es handelt sich hierbei bevorzugt um Einheiten mit einer Länge, die kleiner ist als zwei Meter und noch besser im Bereich von 75 Zentimetern bis 150 Zentimetern liegt, und mit einer Breite, die kleiner ist als ein Meter und noch besser im Bereich von 15 Zentimetern bis 50 Zentimetern liegt. Das Fußbodenelement weist vorzugsweise eine Dicke auf, die bei Fußbodenpaneelen für Parkett oder Parkettimitat üblich ist; das heißt, eine Dicke zwischen 5 und 25 Millimetern.

[0013] Die Besonderheit des ersten Aspekts der vorliegenden Erfindung liegt in der Tatsache, dass mindestens zwei Bestandteile eines Fußbodenelements eine Einheit bilden und doch in Bezug zueinander verschiedene Positionen einnehmen können. So ist es möglich, ein Fußbodenelement zu entwerfen, wovon die vorgenannte Einheit es zulässt, dass die Form des Fußbodenelements, beispielsweise beim Installieren des Fußbodenbelags, durch den Benutzer angepasst werden kann. Weiter ist es möglich, dass die vorgenannten Bestandteile der Fußbodenelemente in der Verpackung eine bestimmte gegenseitige Position einnehmen, beispielsweise eine gegenseitige Position, worin die Fußbodenelemente einfach verpackt werden können, während der Benutzer diese gegenseitige Position doch noch nach Wunsch vor oder während des Installierens des Fußbodenbelags verstellen oder einstellen kann. Vorzugsweise können die vorgenannten Bestandteile

I4F Exhibit 1003 - 258

eine gegenseitige Position einnehmen, worin das Fußbodenelement eine global rechteckige Form aufweist. Eine rechteckige oder quadratische Form ist für das Verpacken der Fußbodenelement sehr günstig.

[0014] Es ist deutlich, dass, je größer die Anzahl verschiedener gegenseitiger Positionen der Bestandteile ist, desto mehr Verlegemöglichkeiten mit dem betreffenden Fußbodenelement geboten werden und desto einfacher ein Wildverband von Zierteilen erreicht werden kann. Somit wird auch bevorzugt, dass diese gegenseitigen Positionen vom Benutzer frei und vorzugsweise uneingeschränkt gewählt werden können. Dies steht im Gegensatz zu einer Ausführungsform, die nur eine begrenzte Anzahl gegenseitiger Positionen zwischen den vorgenannten Bestandteilen zulässt. Es wird jedoch angemerkt, dass diese letztgenannte Ausführungsform auch Vorteile haben kann. Durch Einschränken der Anzahl möglicher gegenseitiger Positionen können beispielsweise Verlegefehler vermieden werden oder können eine oder mehrere Verlegemuster, wie etwa ein Fischgratmotiv, bereits in die Fußbodenelemente aufgenommen sein.

[0015] In einer bevorzugten Ausführungsform können die vorgenannten Bestandteile in Bezug zueinander verschoben werden. In dem Fall, dass die Bestandteile als Platten ausgeführt sind, spezieller Paneele oder Planken, wird bevorzugt, dass sie in ihrer Länge und/oder in Breitenrichtung in Bezug zueinander verschoben werden können. Dieses Verschieben kann auf zwei wichtige Arten und Weisen ausgeführt werden. Einerseits kann die Verschiebung ausgeführt werden, während die Bestandteile sich in derselben Ebene befinden, andererseits kann eine solche Verschiebung auch ausgeführt werden, während die Bestandteile mit ihren Oberseiten über einen bestimmten Winkel aufeinander zu geschwenkt worden sind.

[0016] Ob nun Platten oder Planken betroffen sind, wird bevorzugt, dass jeder der vorgenannten Bestandteile eine im Wesentlichen flache Seite aufweist, die eine Zierseite bildet, und dass diese Zierseite sich noch besser mindestens teilweise an der Oberseite der vorgenannten Einheit und/oder des Fußbodenelements befindet. In solchem Fall ist es deutlich, dass der Benutzer in der Lage sein wird, mindestens die jeweiligen vier Seiten der vorgenannten Bestandteile in Bezug zueinander in Position zu verändern. Dies ist vor allem wichtig für das Erzeugen von Wildverbänden. Bevorzugt weisen die vorgenannten Bestandteile global ein gleichartiges Motiv auf. So können sie ein Plankenmotiv, das aus einer bestimmten Holzsorte besteht, aufweisen oder wiedergeben. Nach einer bevorzugten Ausführungsform weist jeder Bestandteile eine Zierseite auf, die, in der Breite solchen Bestandteils gesehen, das Aussehen einer einzigen Planke hat und, in der Länge gesehen, das Aussehen von einer oder mehreren Planken hat. In solchem Fall werden vorzugsweise auf ein und demselben Fußbodenelement Bestandteile kombiniert, die eine verschiedene Anzahl hölzerner Zierteile aufweisen, speziell Bestandteile, die in der Länge gesehen das Aussehen einer unterschiedlichen Anzahl von Planken haben.

[0017] Es wird angemerkt, dass jeder der vorgenannten Bestandteile vorzugsweise mindestens an einem ersten Paar und besser noch an beiden Paaren gegenüberliegender Seiten mit mechanischen Koppelmitteln versehen ist, die ein gegenseitiges Koppeln zulassen, wobei vorzugsweise an allen Seiten für eine vertikale und horizontale Verriegelung gesorgt wird.

[0018] Zwecks Einfachheit der Konstruktion und/oder des Zusammenstellens der Fußbodenelemente zu einem Fußbodenbelag ist es anzuraten, Bestandteile zu verwenden, die jeder eine Zierseite mit gleichförmigen und gleich großen Abmessungen aufweisen. Es können jedoch auch besondere Effekte erzielt werden, wenn die Zierseiten der Bestandteile ein und desselben Fußbodenelements beispielsweise eine verschiedene Länge und/oder Breite aufweisen.

[0019] Gemäß einer wichtigen Ausführungsform der vorliegenden Erfindung weisen die vorgenannten Bestandteile eine Zierseite mit einer rechteckigen länglichen Form auf, wobei das vorgenannte Zusammenwirken vorzugsweise derart ist, dass die Zierseiten der vorgenannten Bestandteile mindestens in den vorgenannten zwei gegenseitigen Positionen mit ihren Längsrichtungen nebeneinander positioniert sind und vorzugsweise einen gleichen gegenseitigen Abstand aufweisen. Das bedeutet, dass die sich ergebende Verlagerung von der einen gegenseitigen Position zu der anderen gegenseitigen Position der Bestandteile beispielsweise eine reine Verlagerung oder Verschiebung eines der Bestandteile in seiner Längsrichtung sein kann.

[0020] Die vorgenannte wichtige Ausführungsform kann unter anderem zulassen, ein verbessertes Fußbodenelement vom Typ Zwei- oder Mehrplankenelement zu verwirklichen. Vorzugsweise weisen die vorgenannten Zierseiten der vorgenannten Bestandteile bei einem derartigen Fußbodenelement hölzerne Zierteile, oder jeweils ein oder mehrere Reihen hölzerner Zierteile, auf, welche Zierteile oder Reihen dann gemäß dieser wichtigen Ausführungsform mehrere gegenseitige Positionen einnehmen können. Ein Benutzer kann mindestens bei der Installation der Fußbodenelemente über die gegenseitige Position, die die Bestandteile des betreffenden Fußbodenelements in dem Fußbodenbelag einnehmen sollen, bestimmen und somit selbst einen Verband ihrer Zierteil-

I4F Exhibit 1003 - 259

le erzeugen. Es wird angemerkt, dass, wenn die Zierseiten jedes Bestandteils nur ein einziges Zierteil oder nur eine einzige Reihe von Zierteilen aufweist, ein Fußbodenelement erhalten wird, womit ein Wildverband erhalten werden kann. Mit anderen Worten betrifft es in solchem Fall Bestandteile mit einer Zierseite, die, in der Breite solchen Bestandteils gesehen, das Aussehen einer einzigen Planke hat und in der Länge gesehen das Aussehen von einer oder mehreren Planken hat.

[0021] In Bezug auf die zustande gebrachte Einheit wird angemerkt, dass sie verschiedener Art sein kann. Hierunter wird ein Unterschied gemacht zwischen zwei wichtigen möglichen Arten von Einheit. Die Erfindung beschränkt sich jedoch nicht auf diese Möglichkeiten oder deren Kombinationen.

[0022] Eine erste mögliche Art von Einheit betrifft eine Einheit, die mindestens in den vorgenannten zwei gegenseitigen Positionen der Bestandteile vorhanden ist, oder mit anderen Worten sind die vorgenannten einheitsbildenden Mittel mindestens in den vorgenannten zwei gegenseitigen Positionen aktiv. Vorzugsweise bleibt diese Einheit auch während des Veränderns der einen gegenseitigen Position zu der anderen gegenseitigen Position der Bestandteile erhalten.

[0023] Eine zweite mögliche Art von Einheit betrifft eine Einheit, die beim verändern der einen gegenseitigen Position der Bestandteile zu der anderen gegenseitigen Position aufgehoben wird. Eventuell kann die Einheit hierbei so sein, dass eine eventuelle Aufhebung davon beim Erreichen der vorgenannten zweiten Position und/oder beim Zurückkehren zu der vorgenannten ersten Position wiederhergestellt ist oder wiederhergestellt werden kann. Es ist jedoch nicht ausgeschlossen, dass die Einheit derart ist, dass eine eventuelle Aufhebung davon unwiderruflich ist. Es wird angemerkt, dass, wenn von einer Aufhebung der Einheit die Rede ist, gemeint ist, dass diese Aufhebung vorzugsweise ohne maschinelles Werkzeug stattfinden kann. Der Gebrauch von Handwerkzeug, wie etwa eines Messers, eines Stoßblocks, eines Hammers oder dergleichen ist jedoch nicht ausgeschlossen, es wird jedoch bevorzugt, dass solche Aufhebung der Einheit mit der bloßen Hand stattfinden kann.

[0024] Die einheitsbildenden Mittel können auf vielerlei Arten und Weisen ausgeführt sein, je nachdem, ob sie eine Einheit der ersten und/oder der zweiten Art und/oder anderer Art zustande bringen können müssen. Verschiedene mögliche Ausführungsformen werden hier nachstehend erläutert.

[0025] In einer ersten möglichen Ausführungsform bestehen die vorgenannten Einheit bildenden Mittel mindestens aus mechanischen Koppelmitteln, die sich an mindestens einer Seite jeder der vorgenannten Bestandteile befinden, wobei diese mechanischen Koppelmittel zulassen, dass die betreffenden Seiten der vorgenannten Bestandteile miteinander zusammenwirken können. Solche mechanischen Koppelmitteln oder Koppelteile sind vorzugsweise anders ausgeführt als die mechanischen Koppelmittel, die das Fußbodenelement an sich an zwei gegenüberliegenden Kanten davon aufweist. "Anders" ist hierbei im weitesten Sinn zu interpretieren, betrifft jedoch vorzugsweise andere Abmessungen, Geometrie, Material und/oder Funktionalität der Koppelmittel selbst oder zumindest eines Teils davon. Was die Funktionalität der Koppelmittel, die einen Teil der einheitsbildenden Mittel darstellen, betrifft, wird bevorzugt, dass sie an den betreffenden Seiten eine Verriegelung in einer vertikalen Richtung senkrecht zur Fläche des Fußbodenelements und/oder in einer horizontalen Richtung senkrecht zu den vorgenannten Seiten und in der Ebene des Fußbodenelements zustande bringen können. So ist es möglich, dass diese Koppelmittel so ausgeführt sind, dass sie zulassen, dass die betreffenden Bestandteile aneinander gekoppelt werden können und/oder voneinander gelöst werden können, indem ein erster der vorgenannten Bestandteile an der betreffenden Seite in einen beziehungsweise aus einem anderen der vorgenannten Bestandteile mittels einer Schwenkbewegung um die betreffende Seite herum bewegt wird. Es wird angemerkt, dass anhand von Koppelmitteln, wie etwa anhand dieser ersten Möglichkeit beschrieben, sowohl eine Einheit der ersten als auch der zweiten Art zustande gebracht werden kann.

[0026] In einer zweiten möglichen Ausführungsform bestehen die vogenannten einheitsbildenden Mittel mindestens aus einem Teil des Fußbodenelements, der sich an der Unterseite des Fußbodenelements befindet und der seinerseits mindestens einen vorragenden Teil bildet, der sich ab einem ersten Bestandteil dieses Fußbodenelements unter einem zweiten Bestandteil erstreckt oder erstrecken kann, wobei bevorzugt der vorragende Teil mindestens eine Oberfläche bestreicht, die nahezu gleich der Oberfläche des zweiten Bestandteils oder größer ist. Der vorgenannte Teil bildet dann bevorzugt eine Basisstruktur. Gemäß einer ersten Möglichkeit ist diese Basisstruktur einteilig mit dem ersten Bestandteil ausgeführt oder stellt mit anderen Worten einen Teil dieses Bestandteils dar, sodass der erste Bestandteil sich in der Tat mit dem vorgenannten vorragenden Teil bis unter ein oder mehrere andere Bestandteile erstreckt oder erstrecken kann. Gemäß einer zweiten Möglichkeit ist diese Basisstruktur als eine separate Basisplatte oder Basislage ausgeführt, worauf dann der erste Bestandteil fest befestigt ist, beispielsweise geleimt, und diese Basisplatte oder Basislage mit dem vorgenannten vorragenden Teil über diesen ersten Bestandteil hinausragt.

I4F Exhibit 1003 - 260

[0027] Als Material für die Basisplatte oder Basislage kann beispielsweise holzbasiertes Material oder Kunststoffmaterial gewählt werden. So kann die Basisstruktur beispielsweise eine Lage Weichholz umfassen, des Typs, der üblicherweise bei sogenanntem „engineered wood" angewendet wird, oder Holzfasermaterial enthalten, wie etwa HFD-Holzfaserplatte, MDF oder HDF (mitteldichte Faserplatte oder hochdichte Faserplatte). Eventuell kann die Basisstruktur auch aus mehreren Teilen aus Lagen, entweder aus verschiedenen Materialien oder nicht, zusammengesetzt sein.

[0028] Die Basisstruktur, die gemäß der vorgenannten zweiten möglichen Ausführungsform angewendet wird, kann innerhalb der Gesamtheit des Fußbodenelements auch andere Funktionen erfüllen als nur das Zustandebringen der vorgenannten Einheit. Sie kann etwa für die Dämpfung von Reflektions- und/oder Durchgangsgeräusch sorgen. Von diesem Gesichtspunkt aus wird bevorzugt, sogenannte HFD-Holzfaserplatte, die verpresste Holzfasern enthält, und/oder vernetztes Polyethylen in der vorgenannten Basisstruktur anzuwenden. Es wird angemerkt, dass anhand eines Teils des Fußbodenelements, der sich mindestens teilweise unter den vorgenannten Bestandteilen befinden oder erstrecken kann, wie anhand dieser zweiten Möglichkeit beschrieben, sowohl eine Einheit der ersten Art als auch der zweiten Art zustande gebracht werden kann. Es wird angemerkt, dass eine derartige Basisstruktur bei schlanken Bestandteilen, beispielsweise, wenn mindestens einer der vorgenannten Bestandteile ein Längen-Breiten-Verhältnis aufweist, das größer als 10 ist, in bedeutendem Umfang zur Steifigkeit des Fußbodenelements insgesamt beitragen kann und gleichzeitig Widerstand gegen das Krummziehen solcher Bestandteile bieten kann, wodurch anhand solcher Fußbodenelemente problemlos ein Fußbodenbelag zusammengestellt werden kann.

[0029] In einer dritten möglichen Ausführungsform bestehen die vorgenannten einheitsbildenden Mittel mindestens aus einem getrennten Befestigungsmittel, das mindestens die vorgenannten Bestandteile verbinden kann. So können die einheitsbildenden Mittel beispielsweise mindestens aus einer entweder lösbaren oder nicht lösbaren Klebe- oder Leimverbindung oder einem separaten mechanischen Koppelteil bestehen. Anhand der einheitsbildenden Mittel gemäß dieser dritten Ausführungsform kann eine Einheit sowohl der ersten als auch der zweiten Art zustande gebracht werden.

[0030] Es wird angemerkt, dass es erfindungsgemäß nicht ausgeschlossen ist, dass die einheitsbildenden Mittel auf eine andere Weise ausgeführt sind als gemäß den hier vorangehend beschriebenen Möglichkeiten und/oder dass sie aus einer Kombination der hier vorangehend beschriebenen Möglichkeiten bestehen. Solche einheitsbildenden Mittel können an gleich welcher Stelle an dem Fußbodenelement vorgesehen sein. So können sie ebensogut unter, auf oder zwischen den vorgenannten Bestandteilen vorgesehen sein. Als Beispiel für ein einheitsbildendes Mittel, das sich auf den betreffenden Bestandteilen befindet, wird auf die Möglichkeit hingewiesen, die Bestandteile durch Anbringen einer entweder durchsichtigen oder durchscheinenden oder nicht durchsichtigen oder durchscheinenden Klebefolie an ihrer Oberseite oder Zierseite zu verbinden, welche Klebeverbindung dann natürlich zulassen muss, dass die vorgenannten Bestandteile mindestens die zwei vorgenannten gegenseitigen Positionen einnehmen können. Für diese Anwendung können mikrosphärische Leime des Typs, wie in US 3,691,140 beschrieben, nützlich angewendet werden.

[0031] Für andere und/oder praktische Beispiele einheitsbildender Mittel wird auf die detaillierte Beschreibung verwiesen.

[0032] Unabhängig von der Tatsache, ob die vorgenannten Mittel eine Einheit der ersten, der zweiten oder einer anderen Art zustande bringen, wird angemerkt, dass die Einheit der vorgenannten Bestandteile vorzugsweise derart ist, dass sie, unabhängig von der Orientierung des Fußbodenelements, unter Einwirkung nur des Eigengewichts der Bestandteile bewahrt bleibt. Noch besser wird sie auch bewahrt, wenn die Fußbodenelemente normal gehandhabt werden. Unter „normal gehandhabt" wird unter anderem das aus der Verpackung Holen der Fußbodenelemente und das zur Verlegestelle Bringen der Fußbodenelemente verstanden. Weiter wird angemerkt, dass, obwohl dies bevorzugt wird, die vorgenannten Bestandteile sich erfindungsgemäß in der Verpackung nicht unbedingt in einer gegenseitigen Position befinden müssen, worin die vorgenannte Einheit besteht. Gemäß einer anderen Ausführungsform können die vorgenannten Bestandteile sogar getrennt verpackt sein und ist nur von einer Einheit die Rede, nachdem die Bestandteile aus der Verpackung geholt sind und die vorgenannten einheitsbildenden Mittel vom Benutzer angewendet sind, um die Einheit zustande zu bringen.

[0033] Es ist deutlich, dass die Fußbodenelemente der vorliegenden Erfindung auf verschiedene Weisen aufgebaut sein können.

[0034] Beispielsweise kann dies Fußbodenpaneele betreffen, die zum Bilden eines Massivparketts oder einer Imitation solchen Parketts angewendet werden können. In dem ersten Fall geht es dann um Fußbodenelemente, wovon mindestens einer der vorgenannten Bestandteile, und bevorzugt alle Bestandteile, aus massivem Echtholz bestehen, von einer even-

I4F Exhibit 1003 - 261

tuellen verschleißfesten Toplage beispielsweise aus Firnis oder Lack abgesehen. In dem zweiten Fall geht es um Fußbodenelemente, wovon mindestens einer, und vorzugsweise jeder der vorgenannten Bestandteile, einen Kern und eine darauf angebrachte Toplage aufweist. Diese Toplage, oder jedenfalls doch mindestens ein Teil dieser Toplage, kann eine Zierseite bilden, die sich mindestens teilweise an der Oberseite des Fußbodenelements befindet. Die Toplage kann eine Toplage auf Basis von Kunststoff sein, die bevorzugt ein gedrucktes Dekor mit beispielsweise einem Holzmotiv enthält, wie dies bei einer Laminattoplage der Fall sein kann, die anhand eines DPL(Direct Pressure Laminate)- oder HPL(High Pressure Laminate)-Verfahrens hergestellt ist. Es ist an sich bekannt, eine DPL-Toplage zu bilden, indem ein oder mehrere mit Harz versehene Träger, beispielsweise Papierbögen, zusammen mit einem Kernmaterial in eine Presse gebracht und unter Einfluss von Wärme und Druck die vorgenannte Laminat-Toplage direkt auf dem Kernmaterial gebildet wird. Für eine HPL-Toplage wird von einer bereits früher gebildeten Laminattoplage ausgegangen, die an sich aus mit Harz versehenen Trägern besteht, wie etwa Papierbögen, welche Laminattoplage dann auf einem Kernmaterial befestigt, spezieller daraufgeleimt wird. Anstelle einer Toplage auf Basis von Kunststoff kann auch eine Toplage auf Basis von Holz verwendet werden, wobei vorzugsweise die Holzstruktur das Aussehen der vorgenannten Zierseite bestimmt. Es kann sich hierbei um eine Furnierlage oder um eine Lage Holz, die dicker als Furnier ist, beispielsweise dicker als 2 Millimeter, handeln. Für den vorgenannten Kern, worauf sich die Toplage befindet, kann ein holzbasiertes Material gewählt werden, wie etwa ein Material auf Basis von feingemahlenem Holz, beispielsweise MDF oder HDF (Mitteldichte Faserplatte oder Hochdichte Faserplatte), oder wie etwa ein entweder zusammengesetztes oder nicht zusammengesetztes Holzmaterial, beispielsweise massives Fichtenholz oder ein sogenannter Lamellenkern, wobei ein Kern aus verschiedenen Latten zusammengesetzt wird. Für ein allgemeines Beispiel eines Fußbodenpaneels mit Lamellenkern wird auf DE 203 10 959 U1 verwiesen.

[0035] In einer wichtigen Anwendung für sogenanntes „engineered wood", das heißt, Fußbodenelemente, die eine Toplage aus einer Edel- und/oder Hartholzsorte besitzen, unter der eine Lage oder Struktur aus einer billigeren Holzsorte angebracht ist, wie beispielsweise aus dem vorgenannten EP 1 589 160 oder DE 203 10 959 U1 bekannt, sind die Bestandteile des Fußbodenelements der Erfindung hauptsächlich oder nur aus der Edel- und/oder Hartholzsorte ausgeführt, während die Basisstruktur dann mindestens aus der billigeren Holzsorte verwirklicht ist, wobei diese Basisstruktur dann eventuell auf gleichartige Weise zusammengesetzt ist wie auf eine der Weisen, die bereits bei bekannten Ausführungen von „engineered wood" angewandt werden.

[0036] Es ist deutlich, dass die Erfindung sich nicht auf Fußbodenelemente beschränkt, die zur Bildung eines Massivparketts oder einer Imitation davon verwendet werden können. Das vorgenannte gedruckte Dekor, das bei Laminattoplagen angewendet wird, kann schließlich auch andere Motive als ein Holzmotiv wiedergeben. Beispielsweise kann es ein Steinmotiv oder ein Fantasiemotiv wiedergeben. Außerdem kann für die vorgenannte Toplage auch Gebrauch gemacht werden von Toplagen auf Basis eines Materials, gewählt aus der Gruppe von Textil, Teppich, Kork, Vinyl, Keramik, Naturstein, Kunststein und Backstein. Es ist auch möglich, dass mindestens einer der vorgenannten Bestandteile aus einem anderen massiven Material als Holz aufgebaut ist, wie beispielsweise Stein, Kompaktlaminat, Kunststoff oder dergleichen.

[0037] Zum Zusammenstellen der Fußbodenelemente des ersten Aspekts kann von verschiedenen möglichen Verfahren Gebrauch gemacht werden. Hier nachstehend werden eine erste und eine zweite Möglichkeit beschrieben.

[0038] Gemäß einer ersten Möglichkeit kann ein Verfahren zum Zusammenstellen von Fußbodenelementen zu einem Fußbodenbelag angewendet werden, wobei von Fußbodenelementen ausgegangen wird, die mindestens einen ersten und einen zweiten Bestandteil umfassen, wobei ausgehend von mindestens einem solchen ersten Bestandteil und einem solchen zweiten Bestandteil mittels einheitsbildender Mittel eine Einheit zustande gebracht werden kann und wobei das Verfahren mindestens den Schritt umfasst des Zustandebringens einer solchen Einheit und/oder des Veränderns einer solchen Einheit, sowie mindestens den Schritt umfasst des in ihre letztendliche Position in dem Fußbodenbelags Bringens der vorgenannten Bestandteile. Die Einheit und die einheitsbildenden Mittel können auf dieselbe Weise ausgeführt werden wie vorangehend anhand des ersten Aspekts erörtert. Dieses erste mögliche Verfahren gestattet, beim Zusammenstellen der Fußbodenelemente optimalen Gebrauch vom Vorhandensein der einheitsbildenden Mittel und der Einheit, die sie bilden können, zu machen.

[0039] Bevorzugt besteht das, wie vorgenannt, Verändern einer Einheit mindestens darin, dass diese Einheit mindestens zeitweilig aufgehoben wird.

[0040] Ein solches Verfahren gemäß dieser ersten Möglichkeit kann beispielsweise zum Zusammenstellen von Fußbodenelementen verwendet werden, deren Bestandteile sich in einer gegenseitigen Ausgangsposition befinden, wobei der Schritt des Veränderns einer Einheit dann mindestens darin besteht, dass die vorgenannten Bestandteile aus der vorgenannten gegenseitigen Ausgangsposition gebracht werden. Beispielsweise können die vorgenannten

I4F Exhibit 1003 - 262

Bestandteile als Einheit in den Fußbodenbelag eingebracht werden, wonach eventuell, vor dem Erreichen ihrer jeweiligen gegenseitigen Positionen, die vorgenannte Einheit verändert wird. Wenn die Fußbodenelemente in der vorgenannten gegenseitigen Ausgangsposition der Bestandteile eine rechteckige, eventuell längliche, Einheit aufweisen, wird ein sehr praktisches Verlegeverfahren erhalten. Die Fußbodenelemente können auch in dieser gegenseitigen Ausgangsposition verpackt sein, jedoch nicht unbedingt.

[0041] Das Verfahren kann auch zum Zusammenstellen eines Fußbodenbelags verwendet werden, wobei die vorgenannten einheitsbildenden Mittel in den letztendlichen Positionen der vorgenannten Bestandteile aktiv sind, mit anderen Worten, in diesen letztendlichen Positionen eine Einheit zwischen einem ersten und einem zweiten Bestandteil zustande bringen. Die Tatsache, dass die Einheit mindestens in der letztendlichen Position der Bestandteile besteht, kann je nach den angewendeten einheitsbildenden Mitteln verschiedene unterschiedliche Vorteile in Zusammenhang mit der Stärke des erhaltenen Fußbodenbelags, Verringerung von Reflektions- oder Durchgangsgeräusch und dergleichen erbringen.

[0042] Jeder der vorgenannten Bestandteile kann mit einer Zierseite versehen sein, die in der letztendlichen Position des betreffenden Bestandteils in dem Fußbodenbelag dazu gedacht ist, einen Teil der Fußbodenoberfläche zu bilden. Bevorzugt umfasst das Verfahren in diesem Fall mindestens den Schritt des Veränderns der gegenseitigen Positionen der betreffenden Zierseiten, nachdem die Bestandteile bereits in die Ebene des Fußbodenbelags eingebracht sind.

[0043] Gemäß einer zweiten Möglichkeit kann ein Verfahren zum Zusammenstellen von Fußbodenelementen zu einem Fußbodenbelag angewendet werden, wobei diese Fußbodenelemente nicht unbedingt einheitsbildende Mittel im Sinn des ersten Aspekts umfassen. Hierzu wird bei diesem zweiten möglichen Verfahren von einem ersten Bestandteil und einem zweiten Bestandteil ausgegangen, die sich in einer gegenseitigen Ausgangsposition befinden, wobei jeder dieser Bestandteile mit einer Zierseite versehen ist, die in der letztendlichen Position des betreffenden Bestandteils in dem Fußbodenbelag dazu gedacht ist, einen Teil der Fußbodenoberfläche zu bilden, wobei das Verfahren nacheinander mindestens die Schritte umfasst des in der vorgenannten gegenseitigen Ausgangsposition gemeinsam in die Fläche des Fußbodenbelags Bringens sowohl des ersten als auch des zweiten Bestandteils, des aus der gegenseitigen Ausgangsposition Bringens des ersten und des zweiten Bestandteils und des in ihrer jeweiligen letztendlichen Position in dem Fußbodenbelag Anbringens sowohl mindestens des vorgenannten ersten Bestandteils als auch mindestens des vorgenannten zweiten Bestandteils. Dank der Tatsache, dass zwei bewegbare Bestandteile zusammen in die Ebene des Fußbodenbelags gebracht werden, kann die bei einem derartigen Verfahren benötigte Verlegezeit eingeschränkt werden. Wenn dafür gesorgt wird, dass die Fußbodenelemente in der vorgenannten gegenseitigen Ausgangsposition der Bestandteile eine rechteckige, und noch besser auch längliche Form aufweisen, kann die Verlegezeit noch weiter eingeschränkt werden, da solche Fußbodenelemente in der Regel sehr praktisch im Gebrauch sind.

[0044] Der vorgenannte Schritt des aus der gegenseitigen Ausgangsposition Bringens des ersten und zweiten Bestandteils beinhaltet bevorzugt, dass der zweite Bestandteil in einer in Bezug zu dem vorgenannten ersten Bestandteil verschobenen Position in dem Fußbodenbelag angebracht wird. Bevorzugt wird der vorgenannte erste Bestandteil in seine letztendliche Position in dem Fußbodenbelag gebracht, bevor der zweite Bestandteil an seiner letztendlichen Position in diesem Fußbodenbelag angebracht wird.

[0045] Das vorgenannte erste und zweite mögliche Verfahren werden bevorzugt zur Bildung eines Fußbodenbelags angewendet, der Reihen von Zierteilen wiedergibt, wobei dieser Fußbodenbelag mindestens eine erste Reihe von Zierteilen umfasst, die durch erste Bestandteile gebildet wird, und auch mindestens eine zweite Reihe von Zierteilen umfasst, die durch zweite Bestandteile gebildet wird, wobei die vorgenannte erste Reihe und die vorgenannte zweite Reihe seitlich, das heißt, in Breitenrichtung der Reihen, direkt nebeneinander liegen. Es ist auch möglich, dass jede Reihe von Zierteilen jeweils nur aus einem der vorgenannten Bestandteile zusammengestellt ist. Im Fall eines Fußbodenelements vom Typ Zweiplankenelement wird bevorzugt jeweils eine Reihe erster Bestandteile mit einer Reihe zweiter Bestandteile abgewechselt. Es ist deutlich, dass je nach der Anzahl von Bestandteilen des Fußbodenelements bevorzugt jeweils nebeneinanderliegende Reihen von ersten, zweiten, dritten und weiteren Bestandteilen in dem Fußbodenbelag gebildet werden.

[0046] Es wird angemerkt, dass die vorgenannten zwei oder mehr Bestandteile sowohl jeweilige Zierseiten mit im Wesentlichen gleichen Abmessungen als auch Zierseiten mit voneinander abweichenden Abmessungen aufweisen können. Beispielsweise kann mit Zierseiten unterschiedlicher Breite und/oder unterschiedlicher Länge gearbeitet werden. In der meistbevorzugten Ausführungsform der Erfindung weisen alle Bestandteile ein und desselben Fußbodenelements jedoch dieselbe Länge und bevorzugt auch dieselbe Breite auf.

[0047] Es ist deutlich, dass das erste und/oder das zweite mögliche Verfahren für das Verlegen der Fußbodenelemente mit den Merkmalen des ersten As-

I4F Exhibit 1003 - 263

pekts und der bevorzugten Ausführungsformen davon angewendet werden können. Bevorzugt werden die Verfahren zum Zusammenstellen von Fußbodenelementen angewendet, die an mindestens zwei gegenüberliegenden Kanten Koppelmittel aufweisen, welche zulassen, dass zwei solcher Fußbodenelemente an den betreffenden Kanten miteinander zusammenwirken können.

[0048] In solchem Fall umfasst das Verfahren bevorzugt auch mindestens den Schritt des Koppelns der Fußbodenelemente an den betreffenden Kanten.

[0049] Das erste und/oder vor allem das zweite mögliche Verfahren verschaffen auch erhebliche Vorteile, wenn die Breite der Bestandteile eine Breite von weniger als 10 Zentimetern aufweist. Gemäß den Verfahren wird schließlich mit besser handhabbaren und installierbaren Paketen dieser Bestandteile gearbeitet. Es wird nämlich entweder von einer Einheit von mindestens zwei dieser Bestandteile Gebrauch gemacht, oder ein Schritt ausgeführt, der darin besteht, mindestens zwei Bestandteile gemeinsam in den Fußbodenbelag einzubringen.

[0050] Das erste und/oder das zweite mögliche Verfahren kommen vor allem zur Geltung, wenn hierbei von Fußbodenelementen mit zwei oder mehr Bestandteilen ausgegangen wird, die sich in gleichen Positionen nebeneinander befinden und somit in ihrer Ausgangsposition ein global rechteckiges, entweder längliches oder quadratisches, Ganzes definieren, wobei danach mittels des Verfahrens eine letztendliche Position geschaffen wird, indem ein oder mehrere der vorgenannten Bestandteile in eine verschobene Position in Bezug zu den anderen Bestandteilen gebracht werden. Spezieller wird bevorzugt, dass von Bestandteilen mit Zierseiten ausgegangen wird, die längliche Latten oder Planken wiedergeben, wobei diese sich in der Ausgangsposition mit ihren langen Seiten parallel nebeneinander erstrecken.

[0051] Weiter ist es deutlich, dass die Erfindung auch einen Fußbodenbelag betrifft, der anhand der Fußbodenelemente des ersten Aspekts und/oder anhand des vorgenannten ersten und/oder zweiten möglichen Verfahrens zusammengestellt ist. Die Erfindung betrifft auch einen Satz von zwei oder mehr Bestandteilen und einheitsbildenden Mitteln, die dazu gedacht sind, ausgehend von den vorgenannten Bestandteilen eine Einheit zu bilden, und wobei dieser Satz zulässt, ein Fußbodenelement gemäß dem ersten Aspekt der Erfindung oder jedenfalls doch mindestens einen Teil davon zusammenzustellen. Weiter betrifft die Erfindung einen Bestandteil für ein Fußbodenelement, der dazu gedacht ist, zusammen mit einem zweiten, entweder gleichartigen oder nicht gleichartigen, Bestandteil durch Vermittlung einheitsbildender Mittel eine Einheit zu bilden. Es ist deutlich, dass solche Sätze und Bestandteile die Veranlassung geben können zum Zusammenstellen von Fußbodenelementen, die die Merkmale des ersten Aspekts aufweisen, und damit auch die an diesen Aspekt gekoppelten Vorteile zuwege bringen können.

[0052] Weiter betrifft die Erfindung ein Verriegelungssystem, das bei Fußbodenelementen mit den Merkmalen des ersten Aspekts nützlich angewendet werden kann, jedoch nicht auf derartige Fußbodenelemente begrenzt ist. Hierzu betrifft die Erfindung gemäß einem zweiten unabhängigen Aspekt ein Verriegelungssystem zum seitlichen Aneinanderkoppeln von Fußbodenelementen oder Bestandteilen von Fußbodenelementen, wobei das Verriegelungssystem von dem Typ ist, der beim Koppeln einer Seite eines ersten Fußbodenelements an eine Seite eines zweiten Fußbodenelements eine Verriegelung der Fußbodenelemente sowohl in einer vertikalen Richtung senkrecht zur Ebene der Fußbodenelemente, als auch in einer horizontalen Richtung senkrecht auf die betreffenden gekoppelten Seiten zustande bringt, wobei das Verriegelungssystem mindestens aus Koppelmitteln besteht, die im Wesentlichen als eine Feder an der vorgenannten Seite des ersten Fußbodenelements und eine mittels einer unteren Lippe und einer oberen Lippe begrenzte Nut an der vorgenannten Seite des zweiten Fußbodenelements ausgeführt sind und die auch mit Verriegelungsmitteln versehen sind, wobei die vorgenannten Verriegelungsmittel ein vorragendes Verriegelungselement an einer der die Nut begrenzenden vorgenannten Lippen und ein damit zusammenwirkendes Verriegelungselement an der Feder umfassen, mit dem Merkmal, dass das Verriegelungssystem zulässt, dass gekoppelte Fußbodenelemente an der betreffenden gekoppelten Seite mindestens zwei gegenseitige Orientierungen einnehmen können, nämlich einerseits eine erste gegenseitige Orientierung, wobei die Oberseiten der Fußbodenelemente sich im Wesentlichen in derselben Ebene befinden und wobei Oberflächen der vorgenannten Verriegelungselemente miteinander in Kontakt kommende Teile aufweisen, die sich zwischen einer unteren und einer oberen horizontalen Ebene erstrecken, und andererseits eine zweite gegenseitige Orientierung, worin die Oberseiten dieser Fußbodenelemente einen Winkel von weniger als 180 Grad einschließen und die vorgenannten Oberflächen der Verriegelungselemente frei von gegenseitigem Kontakt sind, wobei das in der ersten gegenseitigen Orientierung in Kontakt kommende Teil einer ersten dieser Oberflächen sich in der zweiten gegenseitigen Orientierung oberhalb der vorgenannten oberen horizontalen Ebene erstreckt, und wobei die Fußbodenelemente an der betreffenden Seite in der zweiten gegenseitigen Orientierung noch stets sowohl in vertikaler als auch in horizontaler Richtung verriegelt sind. Mit der Tatsache, dass das in der ersten gegenseitigen Orientierung in Kontakt kommende Teil einer ersten der Oberflächen der Ver-

I4F Exhibit 1003 - 264

riegelungselemente sich in der zweiten gegenseitigen Orientierung oberhalb der vorgenannten oberen horizontalen Ebene erstreckt, ist gemeint, dass die Oberflächen, die in der vorgenannten ersten gegenseitigen Orientierung einen Kontakt bildeten, vollständig voneinander weg gedreht oder mit anderen Worten nicht mehr einander zugewandt sind.

[0053] Die Tatsache, dass das Verriegelungssystem zulässt, dass die Fußbodenelemente oder deren Bestandteile eine gegenseitige Orientierung einnehmen können, worin der Kontakt in Höhe der Verriegelungselemente vollständig aufgehoben ist, kann dafür sorgen, dass die Fußbodenelemente in dieser Orientierung, während sie noch in vertikaler und horizontaler Richtung gekoppelt sind, mit kleinstmöglichem Widerstand entlang einander verschieben können. Diese Eigenschaft kann in vielen Verlegeweisen und sicher bei den vorgenannten ersten und/oder zweiten möglichen Verfahren zum Zusammenstellen von Fußbodenelementen mit den Merkmalen des ersten Aspekts nützlich angewendet werden.

[0054] Bevorzugt sind die Fußbodenelemente in der vorgenannten ersten gegenseitigen Orientierung spielfrei gekoppelt. Diese bevorzugte Ausführungsform resultiert in der besonders nützlichen Kombination einer spielfreien Kopplung mit einer einfach in Längsrichtung verschiebbaren Verbindung.

[0055] In der zweiten gegenseitigen Orientierung ist dagegen bevorzugt ein Spielraum zwischen den anhand des Verriegelungssystems gekoppelten Seiten der Fußbodenelemente vorhanden, wobei dieser Spielraum zulässt, dass die Fußbodenelemente sich über einen begrenzten Abstand in horizontaler Richtung bewegen können, und dass bevorzugt in der vorgenannten zweiten gegenseitigen Orientierung die vorgenannte Verriegelung in vertikaler und horizontaler Richtung über mindestens die Hälfte, und besser noch den gesamten Bereich der an den Spielraum gekoppelten möglichen Bewegung erhalten bleibt. Mit dieser bevorzugten Ausführungsform wird erreicht, dass die Einfachheit des Verschiebens maximiert werden kann, während das Risiko auf das Entkoppeln der Verbindung der Fußbodenelemente oder deren Bestandteile minimiert wird.

[0056] Es ist möglich, dass in der vorgenannten ersten gegenseitigen Orientierung die vorgenannte Lippe, die das vorragende Verriegelungselement bildet, elastisch verformt ist. Bevorzugt ist sie in solchem Fall in der vorgenannten zweiten gegenseitigen Orientierung weniger oder nicht verformt; beispielsweise verbleibt in der vorgenannten zweiten gegenseitigen Orientierung nur eine plastische Verformung dieser Lippe oder ist sie, noch besser, vollständig oder so gut als vollständig in die Position zurückgekommen, die sie vor dem Koppeln der Fußbodenelemente an die betreffende Seite eingenommen hat. Wenn ein Restteil der Ausbiegung in der zweiten gegenseitigen Orientierung festgestellt wird, ist sie am besten kleiner als die Hälfte der Ausbiegung in der ersten gegenseitigen Orientierung, sodass der größte Teil der Ausbiegung elastisch ist.

[0057] In der meistbevorzugten Ausführungsform betrifft die vorgenannte Lippe, die das vorragende Verriegelungselement enthält, die vorgenannte untere Lippe. Solches Verriegelungssystem kann beispielsweise anhand eines Fräsvorgangs einfach hergestellt werden, wobei die betreffenden Seiten dann mit, mit Profilen versehenen, Gebieten versehen werden, die vorzugsweise einteilig mit dem Fußbodenpaneel ausgeführt sind. Solcher Fräsvorgang kann noch einfacher angewendet werden, wenn die untere Lippe sich über die obere Lippe hinaus erstreckt. Selbstverständlich beschränkt die Erfindung sich nicht auf Verriegelungssysteme mit einer längeren unteren Lippe. Die untere Lippe kann beispielsweise auch gleich lang wie die obere Lippe oder kürzer als diese ausgeführt werden. In Bezug auf Fräsvorgänge wird noch auf WO 97/47834 verwiesen, das unter anderem das Fräsen von Koppelmitteln, die sich auf dem Rand von Fußbodenpaneelen befinden, betrifft.

[0058] Die gegenseitigen Orientierungen, die das Verriegelungssystem zulässt, können auf gleich welche Weise durch die Fußbodenpaneele eingenommen werden. Bevorzugt können die Fußbodenelemente mit einer relativen Schwenkbewegung um die gekoppelte Seite von der ersten in die zweite gegenseitige Position gebracht werden.

[0059] Es wird angemerkt, dass die Tatsache, dass das Verriegelungssystem zwei gegenseitige Orientierungen zwischen den Fußbodenelementen oder Bestandteilen zulässt, nicht bedeutet, dass die betreffenden Fußbodenelemente, sobald die betreffende Orientierung erreicht ist, von sich aus in dieser Orientierung bleiben, obwohl dies nicht ausgeschlossen ist. Vielmehr ist gemeint, dass das Verriegelungssystem zulässt, dass der Benutzer die gekoppelten Fußbodenelemente, bevorzugt mit der Hand, in diese beiden gegenseitigen Orientierungen bringen kann und/oder darin halten kann.

[0060] Bevorzugt gestattet das Verriegelungssystem des zweiten Aspekts auch, dass gekoppelte Fußbodenelemente an der betreffenden gekoppelten Seite mindestens noch eine dritte gegenseitige Orientierung einnehmen können, wobei die Oberseiten dieser Fußbodenelemente einen Winkel einschließen, der kleiner ist als der Winkel, den sie in der zweiten gegenseitigen Orientierung einschließen, und wobei die vorgenannten Verriegelungselemente ebenfalls in Kontakt kommende Oberflächen aufweisen. Noch besser sind die Fußbodenelemente in dieser dritten gegenseitigen Orientierung spielfrei gekoppelt. Auch in dieser dritten gegenseitigen Orien-

I4F Exhibit 1003 - 265

tierung ist es möglich, dass die vorgenannte Lippe, die das vorragende Verriegelungselement enthält, elastisch verformt wird. Diese bevorzugte Ausführungsform sorgt für eine zusätzliche Barriere gegen das Entkoppeln der Fußbodenelemente. Selbstverständlich bleibt es möglich, die Fußbodenelemente zu entkoppeln, jedoch ist es möglich, dass hierzu erst ein gewisser Widerstand überwunden werden muss.

[0061] In derselben Hinsicht wie in dem zweiten Aspekt betrifft die Erfindung gemäß ihrem dritten Aspekt ein Verriegelungssystem zum seitlichen Aneinanderkoppeln von Fußbodenelementen oder Bestandteilen von Fußbodenelementen, wobei das Verriegelungssystem von dem Typ ist, der beim Koppeln einer Seite eines ersten Fußbodenelements an eine Seite eines zweiten Fußbodenelements eine Verriegelung der Fußbodenelemente sowohl in einer vertikalen Richtung senkrecht zur Ebene der Fußbodenelemente, als auch in einer horizontalen Richtung senkrecht zu den betreffenden gekoppelten Seiten zustande bringt, wobei das Verriegelungssystem mindestens aus Koppelmitteln besteht, die im Wesentlichen als eine Feder an der vorgenannten Seite des ersten Fußbodenelements und eine mittels einer unteren Lippe und einer oberen Lippe begrenzte Nut an der vorgenannten Seite des zweiten Fußbodenelements ausgeführt sind und die auch mit Verriegelungsmitteln versehen sind, wobei die vorgenannten Verriegelungsmittel ein vorragendes Verriegelungselement an einer der die Nut begrenzenden vorgenannten Lippen und ein damit zusammenwirkendes Verriegelungselement an der Feder umfassen und die vorgenannte Lippe, die das vorragende Verriegelungselement umfasst, in einem gekoppelten Zustand zweier Fußbodenelemente elastisch verformt ist, wobei das Verriegelungssystem zulässt, dass zwei anhand dessen gekoppelte Fußbodenelemente anhand einer relativen Schwenkbewegung um die gekoppelte Seite voneinander abgekoppelt werden können, mit dem Merkmal, dass das Verriegelungssystem so ausgeführt ist, dass die vorgenannte elastische Verformung der Lippe, die das vorragende Verriegelungselement umfasst, beim Entkoppeln der Fußbodenelemente anhand der vorgenannten Schwenkbewegung mindestens drei aufeinanderfolgende Veränderungen erfährt, nämlich eine erste Veränderung, worin die elastische Verformung abnimmt, eine zweite Veränderung, worin die elastische Verformung zunimmt, und eine dritte Veränderung, worin die elastische Verformung wieder abnimmt. Bevorzugt betrifft die vorgenannte Schwenkbewegung eine Bewegung, wobei der eingeschlossene Winkel zwischen den Oberseiten beider Fußbodenelemente abnimmt.

[0062] Die Tatsache, dass bei der ersten Veränderung die elastische Verformung abnimmt, um danach während einer zweiten Veränderung wieder zuzunehmen, bedeutet, dass die Fußbodenelemente am Ende der ersten Veränderung in eine gegenseitige Orientierung gelangen, worin diese elastische Verformung ein örtliches Minimum aufweist und sie deswegen weniger fest verbunden sind, jedoch bedeutet dies auch, dass das Risiko des Entkoppelns durch weiteres Herausschwenken dadurch minimiert ist, dass die vorgenannte Zunahme der elastischen Verformung während der zweiten Veränderung eine Barriere dafür bildet. Eine gegenseitige Orientierung, worin ein örtliches Minimum der elastischen Verformung besteht, eröffnet verschiedene neue Möglichkeiten. Beispielsweise kann dafür gesorgt werden, dass die Fußbodenelemente in der gegenseitigen Orientierung, worin das örtliche Minimum der elastischen Verformung erreicht wird, mit kleinstmöglichem Widerstand entlang einander verschieben können, während sie noch in vertikaler und horizontaler Richtung gekoppelt sind. Diese Eigenschaft kann in vielen Verlegeverfahren und sicherlich im Fall des vorgenannten ersten oder zweiten Verfahrens zum Zusammenstellen von Fußbodenelementen nützlich angewendet werden.

[0063] Die vorgenannte elastische Verformung kann beispielsweise eine Verbiegung der betreffenden Lippe umfassen oder betreffen. In solchem Fall wird bevorzugt, dass während der vorgenannten ersten Veränderung eine Verbiegung der betreffenden Lippe abnimmt, bevorzugt um mindestens 50 Prozent; dass während der zweiten Veränderung die Verbiegung der betreffenden Lippe zunimmt und dass während der dritten Veränderung die Verbiegung der betreffenden Lippe wieder abnimmt. Die vorgenannte Lippe, die das vorragende Verriegelungselement umfasst, betrifft bevorzugt die untere Lippe.

[0064] In einer bevorzugten Ausführungsform des dritten Aspekts nimmt die vorgenannte elastische Verformung und/oder die Verbiegung der betreffenden Lippe während der ersten und/oder der dritten Veränderung ab, bis diese so gut als vollständig oder vollständig relaxiert ist. Wenn am Ende der ersten Veränderung eine vollständige Relaxation erreicht wird, ist die Bequemlichkeit des Verschiebens beider Fußbodenelemente oder Bestandteile entlang der gekoppelten Seiten maximiert.

[0065] Es ist deutlich, dass die Erfindung auch ein Fußbodenelement des Typs betrifft, der an mindestens zwei gegenüberliegenden Seiten, und bevorzugt an allen gegenüberliegenden Seiten, Koppelmittel aufweist, mit dem Merkmal, dass die vorgenannten Koppelmittel zulassen, mit den Koppelmitteln eines gleichartigen Fußbodenelements ein Verriegelungssystem mit den Merkmalen des zweiten und/oder des dritten Aspekts der Erfindung zu bilden.

[0066] Weiter ist es deutlich, dass die einheitsbildenden Mittel der Fußbodenelemente des ersten Aspekts mindestens aus einem Verriegelungssystem

I4F Exhibit 1003 - 266

mit den Merkmalen des zweiten und/oder dritten Aspekts bestehen können, womit dann vorzugsweise die vorgenannten Bestandteile gekoppelt werden. Auch ist es möglich, dass die vorgenannten Koppelmittel, die die Fußbodenelemente des ersten Aspekts an mindestens zwei gegenüberliegenden Kanten aufweisen, es zulassen, mit den Koppelmitteln eines gleichartigen Fußbodenelements ein Verriegelungssystem gemäß dem zweiten und/oder dem dritten Aspekt zu bilden. Weiter ist es möglich, dass die vorgenannten Bestandteile mit Hilfe eines Verriegelungssystems gemäß dem zweiten und/oder dem dritten Aspekt aneinander gekoppelt werden, ob nun einheitsbildende Mittel betroffen sind oder nicht.

[0067] Weiter betrifft die Erfindung noch ein Verriegelungssystem, das äußerst günstig für die Anwendung an mindestens einem Paar gegenüberliegender Seiten der vorgenannten Bestandteile ist und das an schwierig erreichbaren Stellen, wie etwa unter überhängenden Schränken oder unter Türpfosten, doch noch eine einfache Installation der Fußbodenelemente der Erfindung zulässt. Im Fall länglicher, rechteckiger Bestandteile wird das betreffende Verriegelungssystem bevorzugt an den kurzen gegenüberliegenden Seiten dieser Bestandteile angewendet, während an den langen Seiten dieser Bestandteile bevorzugt ein Verriegelungssystem angewendet wird, das mindestens eine Kopplung mittels einer Schwenkbewegung zulässt. Das betreffende Verriegelungssystem ist nicht nur von Nutzen bei den Fußbodenelementen der vorliegenden Erfindung, sondern kann auch breiter angewendet werden, bei gleich welchen Fußbodenelementen. Hierzu betrifft die Erfindung nach noch einem vierten unabhängigen Aspekt davon ein Verriegelungssystem zum seitlichen Aneinanderkoppeln von Fußbodenelementen, beziehungsweise Bestandteilen von Fußbodenelementen, wobei dieses Verriegelungssystem im Wesentlichen aus einem männlichen Koppelteil und einem weiblichen Koppelteil aufgebaut ist, die sich an den Kanten der zu koppelnden Fußbodenelemente oder Bestandteile befinden, wobei die vorgenannten Koppelteile mit Verriegelungsmitteln versehen sind, die in einem gekoppelten Zustand einer Seite eines ersten Fußbodenelements oder Bestandteils und einer Seite eines zweiten Fußbodenelements oder Bestandteils eine Verriegelung der Fußbodenelemente oder Bestandteile in einer horizontalen Richtung senkrecht zu den gekoppelten Seiten in der Ebene der Fußbodenelemente oder Bestandteile zustande bringen, wobei diese Koppelteile jedoch frei von Verriegelungsmitteln sind, die beim Koppeln an der betreffenden Seite eine Verriegelung in einer vertikalen Richtung senkrecht zur Ebene der Fußbodenelemente oder Bestandteile zustande bringen, mit dem Merkmal, dass der vorgenannte gekoppelte Zustand anhand des vorgenannten Verriegelungssystems wahlweise erhalten werden kann, indem entweder das vorgenannte männliche Koppelteil des ersten Fußbodenelements oder Bestandteils mit einer im Wesentlichen abwärtsgerichteten Bewegung in dem weiblichen Koppelteil des zweiten Fußbodenelements oder Bestandteils angebracht wird oder indem das erste und das zweite Fußbodenelement oder Bestandteil mit den Kanten, die mit den vorgenannten Koppelteilen versehen sind, mit einer im Wesentlichen horizontalen Schiebebewegung aufeinander zu bewegt werden.

[0068] Der vierte Aspekt der Erfindung betrifft daher ein Verriegelungssystem, das sowohl eine Verriegelung anhand einer Abwärtsbewegung als auch eine Verriegelung anhand einer hauptsächlich horizontalen Schiebebewegung der Bestandteile zulässt, womit jedoch lediglich eine horizontale Verriegelung erhalten wird und keine vertikale Verriegelung der betreffenden Bestandteile oder Fußbodenelemente erhalten wird.

[0069] Mit der Absicht, die Merkmale der Erfindung zu verdeutlichen, sind hiernach, als Beispiel ohne jeden einschränkenden Charakter, einige bevorzugte Ausführungsformen beschrieben, unter Verweis auf die begleitenden Zeichnungen, worin:

[0070] Fig. 1 in Perspektive ein erfindungsgemäßes Fußbodenelement darstellt;

[0071] Fig. 2 das Fußbodenelement von Fig. 1 darstellt, wobei zwei Bestandteile davon eine andere gegenseitige Position einnehmen, als dies bei Fig. 1 der Fall ist;

[0072] Fig. 3 einen Schnitt gemäß der in Fig. 1 dargestellten Linie III-III darstellt;

[0073] die Fig. 4 bis Fig. 6 Varianten des Fußbodenelements von Fig. 1 darstellen, in einer Ansicht gleichartig der von Fig. 3;

[0074] Fig. 7 eine Variante des Fußbodenelements von Fig. 1 in einer Ansicht gleichartig der von Fig. 2 darstellt;

[0075] Fig. 8 einen Schnitt gemäß der in Fig. 7 dargestellten Linie VIII-VIII darstellt;

[0076] Fig. 9 eine Variante des Fußbodenelements von Fig. 7 in einer Ansicht gleichartig der von Fig. 8 darstellt;

[0077] Fig. 10 einen Schnitt gemäß der in Fig. 7 dargestellten Linie X-X darstellt;

[0078] Fig. 11 in einer Ansicht gleichartig der von Fig. 8 noch eine Variante darstellt;

[0079] Fig. 12 in einer Ansicht gleichartig der von Fig. 10 eine Variante darstellt;

I4F Exhibit 1003 - 267

[0080] Fig. 13 eine Sicht auf das Gebiet darstellt, das in Fig. 12 mit F13 angedeutet ist;

[0081] Fig. 14 in einer gleichartigen Ansicht eine Variante darstellt;

[0082] die Fig. 15 und Fig. 16 noch eine Variante darstellen, jeweils in einer Sicht gleichartig der von Fig. 9 und Fig. 10;

[0083] Fig. 17 und Fig. 18 im Querschnitt noch eine Variante darstellen, wobei Fig. 18 eine Sicht auf das Gebiet gibt, das in Fig. 17 mit F18 angedeutet ist;

[0084] die Fig. 19 und Fig. 20 noch Varianten in einer Ansicht gleichartig der von Fig. 15 oder Fig. 17 darstellen;

[0085] die Fig. 21 bis Fig. 30 Verriegelungssysteme gemäß der Erfindung darstellen, wobei die Fig. 23, Fig. 24, Fig. 28, Fig. 29 und Fig. 30 Ansichten auf die Gebiete darstellen, die jeweils in Fig. 21 mit F23, in Fig. 22 mit F24, in Fig. 25 mit F28, in Fig. 26 mit F29 und in Fig. 27 mit F30 angedeutet sind;

[0086] die Fig. 31 bis Fig. 33 noch weitere Varianten von Fußbodenelementen gemäß der Erfindung in einer Ansicht gleichartig der von Fig. 8 darstellen;

[0087] die Fig. 34 bis Fig. 40 noch einige besondere Varianten und ihre Anwendung in einem Fußbodenbelag illustrieren;

[0088] die Fig. 41 und Fig. 42 verschiedene Schritte in einem möglichen Verfahren zum Zusammenstellen der Fußbodenelemente der Erfindung darstellen;

[0089] die Fig. 43 und Fig. 44 eine Variante eines derartigen Verfahrens illustrieren;

[0090] die Fig. 45 bis Fig. 48 noch bevorzugte Ausführungsformen eines Fußbodenelements gemäß dem ersten Aspekt darstellen, wobei Fig. 46 in größerem Maßstab eine Ansicht auf das Gebiet darstellt, das in Fig. 45 mit F46 angedeutet ist und die Fig. 47 und Fig. 48 jeweils Ansichten gemäß der in Fig. 46 dargestellten Linie XLVII-XLVII und der in Fig. 45 dargestellten Linie XLVIII-XLVIII darstellen;

[0091] die Fig. 49 und Fig. 50 im Querschnitt noch Verriegelungssysteme darstellen, die in einem Fußbodenelement nach der Erfindung angewendet werden können.

[0092] Fig. 1 stellt ein Fußbodenelement **1** gemäß der Erfindung dar. Solches Fußbodenelement **1** ist, wie vorgenannt, ausgehend von mindestens zwei Bestandteilen **2-3** zu einer Einheit **4** zusammengestellt. In dem Beispiel umfasst das Fußbodenelement zwei Bestandteile, die als Planken oder Latten ausgeführt sind, die, wie Fig. 1 zeigt, eine gegenseitigen Position P1 einnehmen können, worin das Fußbodenelement **1** eine global rechteckige und in diesem Fall längliche Form aufweist. In dieser gegenseitigen Position P1 ist es deutlich, dass das abgebildete Fußbodenelement **1** an mindestens zwei einander gegenüberliegenden Kanten **5-6**, beispielsweise an den einander gegenüberliegenden langen Kanten **5-6** und/oder kurzen Kanten **7-8**, Koppelmittel oder Koppelteile **9-10** aufweist. In diesem Fall sind die Koppelmittel im Wesentlichen in Form einer Feder **9** und einer Nut **10** ausgeführt und gestatten sie, dass zwei solcher Fußbodenelemente **1** an den betreffenden Kanten **5-6-7-8** miteinander gekoppelt werden können.

[0093] Jeder der vorgenannten Bestandteile **2-3** weist eine im Wesentlichen flache Seite auf, die eine Zierseite **11** bildet. Diese Zierseiten **11** befinden sich an der Oberseite des zusammengesetzten Fußbodenelements **1**, wo sie in diesem Fall zwei nebeneinanderliegende Reihen **12** von Zierteilen **13** bilden oder darstellen. Das Fußbodenelement betrifft dann auch ein Beispiel für ein verbessertes Mehrplankenelement, spezieller Zweiplankenelement.

[0094] Die Verbesserung, die gemäß der Erfindung in dieser Art von Fußbodenelementen **1** erreicht wird, wird durch die Tatsache erhalten, dass, obwohl die vorgenannten Bestandteile **2-3** eine Einheit **4** bilden, sie doch, wie Fig. 2 darstellt, mindestens auch eine zweite gegenseitige Position P2 einnehmen können, entweder mittels oder nicht mittels Aufheben der vorgenannten Einheit **4**. Die vorgenannten Bestandteile **2-3** können, in diesem Fall in ihrer Längsrichtung L, in Bezug zueinander verschoben werden. Indem die Fußbodenelemente **1** so in dem Fußbodenbelag angebracht werden, dass die Bestandteile **2-3** sich in dieser zweiten gegenseitigen Position P2 befinden, wird erreicht, dass die vorgenannten Reihen **12** von Zierteilen **13** dieses verbesserten Zweiplankenelements an den vorgenannten kurzen Kanten **7-8** des Fußbodenelements **1** nicht mehr gleichzeitig in die Zierteile **13** eines gleichartigen anliegenden Fußbodenelements übergehen. Es wird angemerkt, dass die hier vorgestellte Einheit **4** mehr als zwei gegenseitige Positionen P1-P2 der Bestandteile **2-3** zulässt, da die Bestandteile **2-3** über die gesamte Länge L1 einer Seite **5** des Fußbodenelements **1** entlang einander verschoben werden können.

[0095] Fig. 3 gibt wieder, dass jeder der zwei Bestandteile **23** mit mindestens einem Paar komplementärer Koppelmittel oder Koppelteile **9-10A-9A-10** versehen sein kann, mittels derer sie untereinander oder mit anderen solcher Bestandteile sowohl in horizontaler Richtung H1 als auch in vertikaler Richtung V1 verbunden werden können. Wie in der Einleitung vermeldet ist, ist es bekannt, Paare komplementärer

I4F Exhibit 1003 - 268

Koppelmittel anzuwenden, um Fußbodenpaneele miteinander zusammenwirken zu lassen. Es wird angemerkt, dass die dargestellten Koppelmittel **10A-9A** zulassen, dass die Bestandteile **2-3** entlang ihrer gekoppelten Seiten **5A-6A** in Bezug zueinander verschoben werden können; auch können sie mindestens mit einer Schwenkbewegung voneinander gelöst werden. Weiter wird angemerkt, dass die Koppelmittel **9-10**, womit die Fußbodenelemente aneinandergekoppelt werden können, in dem Beispiel einen Teil der vorgenannten Paare komplmentärer Koppelmittel **9-10A-9A-10** bilden, die an den Bestandteilen **2-3** vorhanden sind. Wie in weiteren Beispielen deutlich wird, ist dies nicht unbedingt der Fall. Zur Verdeutlichung wird angemerkt, dass Koppelmittel, die in erster Linie dazu gedacht sind, Bestandteile miteinander zu verbinden, in dieser Beschreibung und den begleitenden Figuren mit einer Referenzziffer mit Suffix A angedeutet sind, während Koppelmittel, die in erster Linie dazu gedacht sind, Fußbodenelemente miteinander zu verbinden, mit einer Referenzziffer ohne Suffix angedeutet sind.

[0096] Die Besonderheit des Fußbodenelements **1** aus den Fig. 1 bis Fig. 3 besteht darin, dass dieses Fußbodenelement **1** mit einheitsbildenden Mitteln **14** ausgestattet ist, die speziell zum Zustandebringen einer Einheit **4** zwischen den vorgenannten Bestandteilen **2-3** vorgesehen sind. Das betreffende einheitsbildende Mittel **14** umfasst in dem Beispiel eine Lage **15**, die an der Unterseite **16** beider Bestandteile **2-3** angebracht ist, wie etwa eine Papierlage, die an die Unterseite **16** mindestens eines und bevorzugt beider Bestandteile **2-3** befestigt oder darangeklebt ist.

[0097] Obwohl anhand der vorgenannten Lage **15** eine Einheit **4** zwischen den zwei Bestandteilen **2-3** zustande gebracht ist, lässt das Zusammenspiel dieser Lage **15** mit den vorgenannten Koppelmitteln **9A-10A** doch zu, dass die Bestandteile **2-3** verschiedene gegenseitige Positionen P1-P2 einnehmen können. Das Einnehmen einer anderen Position kann stattfinden, indem die gekoppelten Seiten **5A-6A** der Bestandteile **2-3** entweder entriegelt werden oder nicht. Beim Verändern der Position, beispielsweise von der gegenseitigen Position P1 von Fig. 1 zu der gegenseitigen Position P2 von Fig. 2 kann die durch die einheitsbildende Lage **15** zustande gebrachte Einheit **4** eventuell dadurch aufgehoben werden, dass diese Lage **15** beispielsweise an der abgebildeten Strichlinie **17** reißt und die Einheit **4** unwiderruflich verlorengeht, und/oder dadurch, dass die Leimverbindung dieser Lage **15** mit den Bestandteilen **2-3** sich entweder unwiderruflich löst oder nicht. Nach einer nicht dargestellten Variante dieser Ausführungsform kann anstelle mit einer einheitsbildenden Lage **15** auch mit einheitsbildenden Streifen gearbeitet werden, die sich dann bevorzugt an mehreren Stellen in Längsrichtung L der Bestandteile **2-3** befinden. Nach einer anderen Variante ist es auch möglich, dass solche Lage oder solche Streifen sich an der Oberseite oder Zierseite **11** des Fußbodenelements **1** befinden. Solche einheitsbildenden Mittel können dann beispielsweise nach dem Installieren des Fußbodenbelags weggenommen werden und ergeben im Fall einer Lage noch den zusätzlichen Vorteil des Schutzes der Zierseite **11** während des Produzierens, Transportierens und Installierens der Fußbodenelemente.

[0098] Die in Fig. 3 wiedergegebenen Bestandteile weisen den Aufbau eines Laminatfußbodenpaneels auf. Hierzu weisen sie einen Kern **18** und eine darauf angebrachte Toplage **19** auf Basis von Kunststoff auf. Insbesondere betrifft dies hier eine Laminattoplage, die anhand eines DPL-Verfahrens gefertigt ist und sowohl eine sogenannte Dekorlage **20** umfasst, die ein gedrucktes Dekor aufweist, als auch eine schützende verschleißfeste Lage **21** über dem Dekor aufweist, wie etwa ein sogenanntes Overlay. An der Unterseite **16** der Bestandteile befindet sich auch eine sogenannte Rückschicht **22**, die ebenfalls Kunststoff, wie etwa ein ausgehärtetes Melaminharz, umfasst.

[0099] Fig. 4 zeigt eine andere Möglichkeit für die Ausführung der einheitsbildenden Mittel **14**. Sie bestehen hier mindestens aus mechanischen Koppelmitteln **9A-10A**, die zulassen, dass die Bestandteile **2-3** desselben Fußbodenelements **1** miteinander zusammenwirken können. Diese Koppelmittel **9A-10A** sind anders ausgeführt als die mechanischen Koppelmittel **9-10**, die das Fußbodenelement **1** an sich an mindestens zwei gegenüberliegenden Kanten **5-6** aufweist und die gestatten, dass zwei solcher Fußbodenelemente **1** an sich aneinandergekoppelt werden können. In dem Beispiel ist das „anders" sein der Koppelmittel **9A-10A**, die einen Teil der einheitsbildenden Mittel **14** deutlich aus dem Unterschied der Geometrie zwischen den Koppelmitteln **9-10** und den einheitsbildenden Koppelmitteln **9A-10A**. Beispielsweise umfassen die einheitsbildenden Mittel **14** an der Nutseite **6A** davon ein aufrechtstehendes Verriegelungselement **23A**, das die horizontale Verriegelung zwischen den Bestandteilen **2-3** zustande bringt und einen höchsten Punkt aufweist, der sich in einer horizontalen Ebene H2 befindet, wobei diese Ebene H2 sich über dem sich an der Nutseite **6** befindenden aufrechtstehenden Verriegelungselement **23** der Koppelmittel **10** des Fußbodenelements **10** erstreckt. Das „anders" sein der einheitsbildenden Mittel **14** wird in diesem Fall auch durch einen Unterschied in der Funktionalität betont. Während die Koppelmittel **9-10** des Fußbodenelements **1** zulassen, dass diese Fußbodenelemente sowohl mit einer horizontalen Schiebebewegung S aufeinander zu als auch mit einer Schwenkbewegung W entlang ihrer Oberkanten **24** gekoppelt werden können, lassen die einheitsbildenden Mittel **14** aus dem Beispiel lediglich eine Koppelung durch eine Schwenkbewegung W zu. Aus dem Vorangehenden ist deutlich, dass die abgebilde-

I4F Exhibit 1003 - 269

ten einheitsbildenden Koppelmittel **9A-10A** bei Kopplung der betreffenden Bestandteile **2-3** eine Verriegelung sowohl in horizontaler H1 als auch in vertikaler Richtung V1 der Bestandteile **2-3** zustande bringen.

[0100] Fig. 5 zeigt ein Beispiel, wobei die einheitsbildenden Mittel **14** durch ein getrenntes Befestigungsmittel **25**, spezieller durch ein getrenntes mechanisches Koppelteil, gebildet werden, das deutlich anders ist als die Koppelmittel **9-10**, die zulassen, dass das Fußbodenelement an sich an andere gleichartige Fußbodenelemente **1** gekoppelt werden kann.

[0101] Fig. 6 zeigt auch, dass einheitsbildende Mittel **14** gewählt werden können, die mindestens aus einer Leimverbindung **26** bestehen, die eventuell lösbar ist und womit Bestandteile **2-3** ein und desselben Fußbodenelements **1** seitlich aneinander befestigt sind. Solche Leimverbindung **26** kann an gleich welcher Stelle angebracht werden. Als Alternative ist die Leimverbindung **26A** schematisch dargestellt. Die Leimverbindungen **26-26A** müssen sich nicht über die gesamte Länge eines Bestandteils **23** erstrecken, sondern können örtlich, eventuell tropfenweise, über diese Länge vorgesehen sein.

[0102] Fig. 7 gibt in Perspektive noch ein Fußbodenelement **1** wieder, wobei die einheitsbildenden Mittel **14** als ein Teil **27** des Fußbodenelements **1** ausgeführt sind, das sich sowohl unter dem ersten Bestandteil **2** als auch unter dem zweiten Bestandteil **3** befinden kann.

[0103] Fig. 8 zeigt, dass dieses Teil **27** als eine Basisstruktur **28** aufgefasst sein kann, worauf sich jeder der Bestandteile **2-3** befinden kann. Diese Basisstruktur **28** kann beispielsweise aus einem geräuschdämpfenden Material bestehen, wie sogenannter HFD-Holzfaserplatte oder Polyethylen, oder kann, wie in Fig. 9 wiedergegeben, eventuell eine geräuschdämpfende Lage **29** umfassen. Anhand dieser Basisstruktur **28** könen auch andere Effekte erzielt werden. Bevorzugt ist mindestens einer der Bestandteile **2** fest mit der Basisstruktur **28** verbunden, beispielsweise durch Verleimen dieses Bestandteils mit der Basisstruktur **28**, während mindestens einer der anderen Bestandteile **3** frei auf der vorgenannten Basisstruktur **28** liegt. Auf diese Weise wird die Komplexität des Fußbodenelements **1** in Grenzen gehalten, während doch eine Einheit **4** mit in Bezug zueinander bewegbaren Bestandteilen **2-3** erhalten wird. Selbstverständlich bewegt sich in solchem Fall die Basisstruktur **28** zusammen mit dem Bestandteil **2**, der fest damit verbunden ist. Durch das auf gleich welche Weise fest Verbinden mindestens eines der Bestandteile **2** mit einer Basisstruktur **28** wird ein Fußbodenelement mit einer erhöhten Steifigkeit erhalten, mit allen günstigen Auswirkungen davon. Beispielsweise wird ein derartiges Fußbodenelement **1** eine geringere Neigung zum Krummziehen aufweisen, was zu einem erhöhten Verlegekomfort führt. Es wird angemerkt, dass eine feste Verbindung eines Bestandteils mit einer Basisstruktur auch dadurch erhalten sein kann, dass der betreffende Bestandteil einteilig mit der Basisstruktur ausgebildet ist.

[0104] Wie bereits aus den Fig. 1, Fig. 2 und Fig. 7 deutlich hervorging, wird mit Fig. 10 nochmals betont, dass die Bestandteile **23** der Fußbodenelemente gemäß der Erfindung auch an einem zweiten Paar gegenüberliegender Seiten **7A-8A** mit Koppelmitteln **30-31** versehen sein können, die beispielsweise gestatten, dass die Bestandteile **2-3** verschiedener Fußbodenelemente **1** aneinandergekoppelt werden können. In dem Beispiel betrifft dies auch Koppelmittel oder Koppelteile **30-31**, womit sowohl eine Verriegelung in horizontaler Richtung H1 als auch in vertikaler Richtung V1 an den betreffenden Seiten **7A-8A** erhalten werden kann.

[0105] Es ist deutlich, dass gemäß einer nicht dargestellten Variante die Koppelmittel **9** und **10**, an den langen Seiten **5-6** des Fußbodenelements, sowie die Koppelmittel **9A-10A**, anders ausgeführt sein können als die Koppelmittel **30** und **31** an den kurzen Seiten des Fußbodenelements. In einer praktischen Ausführungsform hiervon werden die Koppelmittel **9-10** und/oder **9A-10A** beispielsweise so ausgeführt werden, dass die Bestandteile an ihren langen Seiten seitlich ausschließlich mittels einer Schwenkbewegung ineinandergefügt werden können und nicht mittels einer Schiebe- und Einrastbewegung, während die Koppelmittel **30-31** sehr wohl ein Zusammenfügen mittels einer Schiebe- und Einrastbewegung zulassen.

[0106] Fig. 11 gibt ein erfindungsgemäßes Fußbodenelement wieder, wobei die vorgenannte Einheit **4**, die durch die einheitsbildenden Mittel **14** zustande gebracht wird, mindestens darin besteht, dass ein erster Bestandteil **2** der vorgenannten Bestandteile **2-3** sich bis unter einen anderen Bestandteil **3** der vorgenannten Bestandteile erstreckt und in diesem Fall auf diese Weise eine Basisstruktur **28** bildet. In Strichlinie **32** ist wiedergegeben, dass es nicht ausgeschlossen ist, dass die Basisstruktur **28** des Fußbodenelements **1** an sich mit Koppelmitteln **9-10** versehen ist, die dann zulassen, dass die Basisstrukturen **28** von zwei solcher Fußbodenelemente **1** aneinandergekoppelt werden können.

[0107] Fig. 12 gibt anhand des Fußbodenelements **1** von Fig. 11 noch eine Möglichkeit wieder, wie die Fußbodenelemente **1** der Erfindung an ihrer kurzen Seite **7-8** gekoppelt werden können. Hierzu sind sowohl mindestens der zweite Bestandteil **3** als auch die Basisstruktur **28** mit mechanischen Koppelteilen **30-30A-31-31A** versehen, die an sich lediglich eine Verriegelung in horizontaler Richtung H1 zulassen.

I4F Exhibit 1003 - 270

Wie Fig. 13 wiedergibt, kann durch das Zusammenwirken der Koppelmittel **30A-31A** der Bestandteile **2-3** und der Koppelmittel **30-31** der Basisstruktur **28** trotzdem doch eine Verriegelung in vertikaler Richtung V1 erhalten werden. Die vertikale Verriegelung wird dadurch zustande gebracht, dass mindestens einer der Bestandteile **3** sich in dem Fußbodenbelag bis über den Rand **8** der Basisstruktur erstreckt. Fig. 14 gibt noch eine gleichartige Ausführung wieder, wobei die Koppelmittel **30A-31A** des Bestandteils **3** lediglich eine vertikale Verriegelung zulassen.

[0108] Fig. 15 gibt ein gleichartiges Fußbodenelement **1** wieder wie das der Fig. 8 und Fig. 9. Die Bestandteile **2-3** sind jedoch nicht als Laminatfußbodenpaneele aufgebaut, sondern mindestens ein und in diesem Fall beide Bestandteile **2-3** davon sind als Paneele für sogenanntes Zweischichtparkett (Niederländisch: tweelaagsparket; Englisch: dual layer parquet) aufgebaut. Derartige Paneele bestehen, wie an sich beispielsweise aus EP 1 589 160 bekannt ist, im Wesentlichen aus zwei Lagen Holz, nämlich einerseits einer Oberflächenschicht **33** aus hartem Massivholz, das die Zierseite **11** bildet, und andererseits einer Kernlage **34** aus Weichholz. Diese Ausführung der Erfindung ist besonders interessant für Hersteller von Paneelen für Zweischichtparkett. Für die Produktion der Bestandteile **2-3** können sie schließlich ihre bekannten Produktionsverfahren anwenden, während sie zum Erhalten der Vorteile der vorliegenden Erfindung lediglich eine Basisstruktur **28** vorsehen können. Bevorzugt wird in solchem Fall mindestens einer der Bestandteile **2** fest mit der Basisstruktur **28** verbunden, während mindestens ein anderer Bestandteil **3** frei auf dieser Basisstruktur **28** liegt, jedoch mit dem fest verbundenen Bestandteil **2** zusammenwirkt oder zusammenwirken kann. Basisstrukturen **28** auf Basis von Holz oder gemahlenem Holz, wie etwa HFD-Holzfaserplatte, werden bei Ausführungsformen mit Bestandteilen **2-3**, die als Zweischichtparkettpaneele aufgebaut sind, bevorzugt.

[0109] Fig. 16 gibt wieder, dass die Kernlage **34** solcher Zweischichtparkettpaneele als ein sogenannter Lamellenkern ausgeführt sein kann, der aus mehreren in Querrichtung orientierten Latten **34A-34B** besteht, die beispielsweise an sich aus Massivholz, wie etwa Holz, das weicher als die vorgenannte Oberflächenlage **33** ist, bestehen können. Beispiele von Holz, das für diese Latten angewendet werden kann, sind Fichtenholz oder Pappelholz. Es ist nicht ausgeschlossen, dass eine Anzahl oder alle vorgenannten Latten **34A-34B** aus einem anderen, bevorzugt holzbasierten, Material ausgeführt sind. Die Latten **34B**, aus denen die Koppelmittel **30-31** einteilig geformt sind, können beispielsweise aus MDF oder HDF bestehen. Aus WO 97/47834 ist inzwischen bekannt, dass solche Faserplatte ideale Eigenschaften hat, um Koppelmittel daraus zu bilden.

[0110] Fig. 17 gibt noch eine wichtige Ausführungsform eines Fußbodenelements **1** gemäß der Erfindung wieder, wobei die einheitsbildenden Mittel **14** außer einer Basisstruktur **28** auch noch mechanische Koppelmittel **9A-10A** umfassen, die anders sind als die Koppelmittel **9-10**, die zulassen, dass solche Fußbodenelemente **1** an sich gekoppelt werden können. Das „anders" sein der einheitsbildenden Koppelmittel **9A-10A** kann bei den abgebildeten einheitsbildenden Mitteln **14** hauptsächlich auf die Tatsache reduziert werden, dass sie kleiner ausgeführt sind. Als maßgeblich für den Unterschied in den Abmessungen zwischen den Koppelmitteln **9-10** und **9A-10A** kann unter anderem der Unterschied in dem Abstand D zwischen der Verriegelungsfläche an dem aufrecht stehenden Verriegelungselement **23-23A** der Nut **10-10A** und der Oberkante **24** des betreffenden Bestandteils **2**, beziehungsweise Fußbodenelements **1**, angesehen werden. Diese Abstände können sich beispielsweise verhalten wie 5 zu 4. Bevorzugt ist dieses Verhältnis größer als 3 oder besser noch größer als 2 oder sogar größer als anderthalb.

[0111] Fig. 18 gibt wieder, wie Fußbodenelemente **1**, wie diejenigen aus Fig. 17, miteinander gekoppelt werden können. Dies ist beispielsweise möglich anhand einer horizontalen Schiebebewegung S, oder anhand einer Schwenkbewegung W um die betreffende Kante **5-6**. Durch Koppelung der Fußbodenelemente **1** kann dafür gesorgt werden, dass der Bestandteil **3**, der frei auf der Basisstruktur **28** des Fußbodenelements **1** liegt, zwischen dem ersten Bestandteil **2** und dem an dieses Fußbodenelement **1** gekoppelten anderen Fußbodenelement **1** aufgespannt wird.

[0112] Fig. 19 gibt ein gleichartiges Fußbodenelement **1** wieder wie das Fußbodenelement **1** aus Fig. 17, jedoch mit einem anderen Aufbau als ein Laminatfußbodenpaneel. Beide Bestandteile **2-3** weisen einen Kern **18** mit einer darauf angebrachten Toplage **19** auf Basis von Holz auf. Das kann beispielsweise eine Furniertoplage betreffen, oder, wie es hier der Fall ist, eine Holztoplage **19** betreffen, die dicker als Furnier ist. Der Kern **18** des Fußbodenelements **1** kann beispielsweise aus Weichholz, wie etwa Pappel- oder Fichtenholz, bestehen oder zusammengestellt sein. In dem Beispiel ist an der Unterseite **35** des Fußbodenelements **1** oder der Basisstruktur **28** noch eine Rückschicht **22** aus Massivholz angebracht. Selbstverständlich ist es möglich, dass eine solche Rückschicht **22** bei allen Bestandteilen **2-3** vorhanden ist. Es wird angemerkt, dass hier, wie es bei den Fig. 15 und Fig. 16 der Fall war, mindestens einer der Bestandteile **3** als ein Paneel von sogenanntem Zweischichtparkett aufgebaut sein kann und dass der vorgenannte Kern **18** aus Latten zusammengestellt sein kann.

[0113] Fig. 20 gibt eine Variante des Fußbodenele-

I4F Exhibit 1003 - 271

ments **1** aus Fig. 19 wieder, wobei die Toplage **19** mindestens genauso dick ausgeführt ist wie einer der vorgenannten Bestandteile **3**. Diese Ausführungsform ist einfach zu fertigen. Es ist deutlich, dass ein Aufbau, wobei mindestens einer der Bestandteile **3** ausschließlich aus einer entweder zusammengestellten oder nicht zusammengestellten Toplage **19** besteht, auch Vorteile hat, wenn die Toplage **19** aus anderen Materialien als Holz aufgebaut oder zusammengestellt ist.

[0114] In Strichlinie **36** ist in den Fig. 17 und Fig. 19 noch wiedergegeben, dass die Basisstruktur **28** eines solchen Fußbodenelements **1** aus verschiedenen Teilen **37**, die fest miteinander verbunden sind, beispielsweise verleimt sind, zusammengestellt sein kann. Auf diese Weise kann verhindert werden, dass bei der Fertigung solcher Fußbodenelemente **1** zu viel Materialverlust auftritt.

[0115] Fig. 21 gibt ein Verriegelungssystem **38** wieder für das seitliche Aneinanderkoppeln von Fußbodenelementen **1** mittels einer Schwenk- und/oder Schiebebewegung, wobei dieses Verriegelungssystem auch die Merkmale des zweiten Aspekts aufweist. Ein solches Verriegelungssystem **38** besteht mindestens aus Koppelmitteln **9-10**, die im Wesentlichen als eine Feder **9** an der Seite **5** eines ersten Fußbodenelements **1** und eine mittels einer unteren Lippe **39** und einer oberen Lippe **40** begrenzte Nut **10** an der Seite **6** eines zweiten Fußbodenelements **1** ausgeführt sind. Diese Koppelmittel **9-10** sind weiter mit Verriegelungsmitteln **41** versehen. Wie hier abgebildet, umfassen diese Verriegelungsmittel **41** ein vorragendes Verriegelungselement **23** an einer der vorgenannten Lippen **39**, in diesem Fall ein aufrecht stehendes Verriegelungselement **23** an der unteren Lippe **39**, und ein damit zusammenwirkendes Verriegelungselement **42** an der Feder **9**, in diesem Fall an der Unterseite **43** der Feder **9**.

[0116] Die Fig. 21 und Fig. 22 geben zwei gegenseitige Orientierungen O1-O2 wieder, die zwei anhand des vorgenannten Verriegelungssystems **38** gekoppelte Fußbodenelemente **1** einnehmen können. Die Fig. 22 und Fig. 23 verdeutlichen jeweils die gegenseitigen Orientierungen aus den Fig. 20 und Fig. 21. Die Fig. 21 und Fig. 23 geben die gleiche erste gegenseitige Orientierung O1 wieder, wobei die oberen Flächen oder Zierseiten **11** der Fußbodenelemente **1** sich hauptsächlich in derselben Ebene befinden und wobei Oberflächen **44-45** der vorgenannten Verriegelungselemente **23-42** miteinander in Kontakt kommende Teile **46-47** aufweisen, die sich zwischen einer unteren horizontalen Ebene H3 und einer oberen horizontalen Ebene H4 erstrecken. Fig. 22 und Fig. 24 geben dieselbe zweite gegenseitige Orientierung O2 wieder, wobei die oberen Flächen oder Zierseiten **11** einem Winkel A2 von weniger als 180 Grad einschließen und die vorgenannten Oberflächen **44-45** frei von gegenseitigem Kontakt sind. Außerdem erstreckt sich der in der ersten gegenseitigen Orientierung O1 in Kontakt kommende Teil **46** einer ersten dieser Oberflächen **44** sich in dieser zweiten gegenseitigen Orientierung O2 über der vorgenannten oberen horizontalen Ebene H4. Auch sind das erste und das zweite Fußbodenelement **1** in der zweiten gegenseitigen Orientierung O2 noch stets sowohl in vertikaler Richtung V1 als auch in horizontaler Richtung H1 miteinander verriegelt. Es wird angemerkt, dass, unter anderem bei dem abgebildeten Verriegelungssystem **38**, die Fußbodenelemente **1** mit einer relativen Schwenkbewegung W um die gekoppelte Seite von der ersten zu der zweiten gegenseitigen Orientierung O1-O2 gebracht werden können. Weiter wird angemerkt, dass gegenseitige Orientierungen mit den Eigenschaften der vorgenannten zweiten gegenseitigen Orientierung O2 bevorzugt über einen Schwenkbereich von mindestens 5 Grad, und besser noch von mindestens 10 oder mindestens 15 Grad eingenommen werden können. Die Tatsache, dass die horizontale und vertikale Verriegelung über einen derartigen Bereich beibehalten werden kann, ist besonders nützlich beim Installieren von Fußbodenelementen **1**, die an mindestens zwei einander gegenüberliegenden Seiten **5-6** mit einem solchen Verriegelungssystem **38** versehen sind, und bei Bestandteilen **2-3** von Fußbodenelementen **1**, die anhand eines solchen Verriegelungssystems **38** zusammenwirken können.

[0117] Aus Fig. 23 ist es deutlich, dass die untere Lippe **39** sich in der ersten gegenseitige Orientierung O1 in einer ausgebogenen Position befindet. Zum Vergleich ist in Strichlinie die Kontur **48** der unteren Lippen **39** vor dem Koppeln wiedergegeben. Ein solches Ausbiegen kann beispielsweise zu einer Vorspannung in dem Verriegelungssystem **18** führen, was an sich aus WO 97/47834 bekannt ist. Ob nun von Vorspannung die Rede ist oder nicht, wird bevorzugt, dass die Fußbodenelemente **1** in der vorgenannten ersten gegenseitigen Orientierung O1, wie es hier der Fall ist, spielfrei gekoppelt sind.

[0118] Aus Fig. 24 ist deutlich, dass die Oberflächen **44-45**, die in Fig. 23 einen gegenseitigen Kontakt bilden, in der zweiten gegenseitigen Orientierung O2 frei von Kontakt sind. Der in der ersten gegenseitigen Orientierung im Kontakt kommende Teil **46** befindet sich nun vollständig über der vorgenannten oberen horizontalen Ebene H4. In dieser zweiten gegenseitigen Orientierung O2 ist die untere Lippe **39** weniger verformt als in der ersten gegenseitigen Orientierung O1. Wie wiedergegeben, ist die Lippe **39** vollständig in die Position **48** zurückgekommen, die sie vor dem Koppeln der Fußbodenelemente **1** einnahm. Es ist auch möglich, dass in der zweiten gegenseitigen Position O2 ein Spielraum **50** zwischen den gekoppelten Seiten vorhanden ist. Eine solche Position ist in Strichlinie **49** in Fig. 24 wiedergege-

I4F Exhibit 1003 - 272

ben. Dieser Spielraum **50** hat zur Folge, dass die Fußbodenelemente **1** sich über einen bestimmten Abstand in horizontaler Richtung H1 bewegen können. In dem Beispiel ist der entstandene Bewegungsraum jedoch so klein, dass die vorgenannte Verriegelung in vertikaler Richtung V1 und horizontaler Richtung H1 über den gesamten Bereich der möglichen Bewegung erhalten bleibt.

[0119] Es ist selbstverständlich möglich, dass die Fußbodenelemente **1** noch andere gegenseitige Orientierungen einnehmen können als Orientierungen mit den Eigenschaften der vorgenannten ersten oder zweiten gegenseitigen Orientierung O1-O2, wie die in der Einleitung in diesem Zusammenhang genannte dritte gegenseitige Orientierung, wobei bevorzugt wieder eine spielfreie Verriegelung erreicht wird und/oder die vorgenannte untere Lippe wieder elastisch verformt ist.

[0120] Fig. 25 gibt noch ein Verriegelungssystem **38** für das seitliche Aneinanderkoppeln von Fußbodenelementen **1** mittels einer Schwenk- und/oder Schiebebewegung wieder, jedoch mit den Merkmalen des dritten Aspekts der Erfindung. Aus der Figur ist deutlich, dass das Verriegelungssystem **38** global auf dieselbe Weise aufgebaut ist wie das Verriegelungssystem von Fig. 21. Weiter ist das Verriegelungssystem **38** so aufgebaut, dass die untere Lippe **39** in der normalen Gebrauchsposition der Fußbodenelemente **1**, nämlich der Position, worin die oberen Flächen oder Zierseiten **11** sich im Wesentlichen in derselben Ebene befinden, elastisch verformt ist. Die Besonderheit des hier wiedergegebenen Verriegelungssystems **38** ist, dass die untere Lippe **39** beim Entkoppeln des ersten und zweiten Fußbodenelements **1** anhand einer Schwenkbewegung W mindestens drei aufeinanderfolgende Veränderungen durchmacht.

[0121] Die untere Lippe **39** macht eine erste Veränderung durch, wenn das Fußbodenelement **1** aus der in Fig. 25 wiedergegebenen Orientierung in die in Fig. 26 wiedergegebene Orientierung gebracht wird. Die Veränderung besteht hier in einer Abnahme der elastischen Verformung, im vorliegenden Fall der Ausbiegung, der unteren Lippe **39**.

[0122] Die zweite Veränderung findet statt, wenn das Fußbodenelement noch weiter bis in die Orientierung, die in Fig. 27 wiedergegeben ist, ausgeschwenkt wird. Diese zweite Veränderung. besteht in einer Zunahme der elastischen Verformung oder Ausbiegung der unteren Lippe **39**.

[0123] Die dritte Veränderung manifestiert sich, wenn das Fußbodenelement **1** aus der in Fig. 27 wiedergegebenen Orientierung heraus vollständig aus dem anderen Fußbodenelement herausgeschwenkt wird. Diese dritte und in dem Beispiel letzte Veränderung besteht dann wieder aus einer Abnahme der elastischen Verformung oder Ausbiegung der unteren Lippe **39**.

[0124] Die Fig. 28 bis Fig. 30 geben in größerem Maßstab die Verformung, Ausbiegung oder Verlagerung der unteren Lippe **39** in Nähe ihres distalen Endes **51** für die gegenseitigen Orientierungen der Fußbodenelemente **1** wieder, die jeweils in den Fig. 25 bis Fig. 27 wiedergegeben sind.

[0125] Durch Vergleich mit der in Strichlinie wiedergegebenen Kontur **48** der unteren Lippe **39** zum Koppeln der Fußbodenelemente **1** ist es aus den Fig. 28 und Fig. 29 deutlich, dass in dem Beispiel die vorgenannte erste Veränderung oder die Abnahme der Verformung zu einer vollständig entspannten unteren Lippe **39** führt, während die Ausbiegung dieser unteren Lippe **39** während der zweiten Veränderung wieder zunimmt bis zu einer in Fig. 30 wiedergegebenen Position oder Ausbiegung, die mit der Ausbiegung in Fig. 28 vergleichbar ist. Es ist jedoch nicht ausgeschlossen, dass die Ausbiegung, die nach der zweiten Veränderung erreicht wird, kleiner oder größer ist als diejenige, die in der normalen Gebrauchsposition vorhanden ist. Es wird angemerkt, dass normale Werte für die Verlagerung der unteren Lippe **39** in Nähe ihres distalen Endes zwischen einigen Hundertstel- und einigen Zehntelmillimetern schwanken können.

[0126] Für den Fachmann ist es deutlich, wie die Ausführungsformen von Fußbodenelementen **1** gemäß dem ersten Aspekt aus den Fig. 1 bis Fig. 20 ausgebreitet werden können zu und wie die Verriegelungssysteme **38** der Fig. 21 bis Fig. 30 in Fußbodenelementen **1** mit mehr als zwei Bestandteilen **2-3** angewendet werden können, beispielsweise mit der Absicht, verbesserte Drei-, Vier- oder Mehrplankenelemente zu bilden.

[0127] Im allgemeinen weisen derartige Ausführungsformen die Merkmale auf, dass, ausgehend von drei oder mehr Bestandteilen **2-3**, anhand eines oder mehrerer einheitsbildender Mittel **14**, beispielsweise anhand einer Basisstruktur **28**, eine Einheit **4** zustande gebracht wird, wobei mindestens einer dieser Bestandteile **3**, und bevorzugt mindestens zwei, und besser noch alle Bestandteile in Hinsicht auf alle übrigen Bestandteile **2** dieses Fußbodenelements **1** verschiedene Positionen P1-P2 einnehmen können. Weiter ist es bevorzugt, dass jeder dieser Bestandteile **2-3** eine Zierseite **11** aufweist, die sich an der Oberseite des Fußbodenelements **1** befindet. Als Beispiel werden in den Fig. 31 bis Fig. 40 und Fig. 45 bis Fig. 48 einige mögliche Ausführungsformen mit ihrer Anwendung aufgeführt.

[0128] Fig. 31 gibt ein Fußbodenelement gemäß der vorliegenden Erfindung wieder, gleichartig der

I4F Exhibit 1003 - 273

Ausführungsform von Fig. 8, Fig. 9 oder Fig. 15, wo mit dem Fußbodenelement **1** aus den Fig. 8, Fig. 9 oder Fig. 15 ein verbessertes Zweiplankenelement bezweckt wurde, wird mit dem Fußbodenelement **1** von Fig. 31 ein verbessertes Dreiplankenelement bezweckt. Hierzu umfasst das Fußbodenelement somit auch drei Bestandteile **2-3-52**, die jeder eine Zierseite **11** aufweisen. Ausgehend von diesen drei Bestandteilen **2-3-52** ist anhand eines einheitsbildenden Mittels **14**, in diesem Fall einer Basisstruktur **28**, eine Einheit **4** gebildet. Mindestens einer dieser Bestandteile **2-3-52**, und bevorzugt alle Bestandteile **2-3-52**, können in Hinsicht auf alle übrigen Bestandteile verschiedene Positionen einnehmen. Bevorzugt ist mindestens einer der Bestandteile **2** fest mit der Basisstruktur **28** verbunden, während mindestens einer der übrigen und bevorzugt beide übrigen Bestandteile **3-52** frei auf der Basisstruktur **28** liegen.

[0129] Fig. 32 zeigt ebenfalls eine Ausführungsform, jedoch nun gleichartig der von Fig. 17, die ein verbessertes Dreiplankenelement ergeben kann. Hierbei besteht das einheitsbildende Mittel **14** aus einem Teil **27** des ersten Bestandteils **2**, der sich mindestens unter beiden anderen Bestandteilen **3-52** erstreckt.

[0130] Fig. 33 betrifft ebenfalls eine Ausführungsform, die ein verbessertes Dreiplankenelement ergeben kann, jedoch lediglich aus zwei Bestandteilen **2-3**, die in Bezug zueinander verschiedene Positionen einnehmen können, aufgebaut ist.

[0131] Fig. 34 zeigt zwei Beispiele von Fußbodenelementen **1** mit den Merkmalen des ersten Aspekts, wobei anhand von vier Bestandteilen **2-3-52-53** eine Einheit **4** zustande gebracht ist. Das einheitsbildende Mittel **14** betrifft hier eine Basisstruktur **28**, die sich mindestens unter allen Bestandteilen **2-3-52-53** erstreckt oder erstrecken kann. Außer den abgebildeten gegenseitigen Positionen P2 der Bestandteile **2-3-52-53** können auch noch gegenseitige Positionen P1 eingenommen werden, wobei das Fußbodenelement **1** eine global rechteckige, und in diesem Fall quadratische Form aufweist. In dem Beispiel weisen sowohl die Basisstruktur **28** als auch die Bestandteile **2-3-52-53** an zwei Paar gegenüberliegender Kanten oder Seiten Koppelmittel **9-9A-10-10A** auf, bevorzugt betrifft dies Koppelmittel, die mindestens eine horizontale oder eine vertikale Verriegelung zulassen, und noch besser beide zulassen. Es wird angemerkt, dass es nicht ausgeschlossen ist, dass lediglich eines von beiden, die Basisstruktur **28** oder die Bestandteile **2-3-52-53**, solche Koppelmittel aufweist. Auch ist es nicht ausgeschlossen, dass die Koppelmittel an lediglich zwei gegenüberliegenden Seiten der Basisstruktur und/oder den Bestandteilen vorgesehen werden. Ebenso wird vorzugsweise zwischen solchen Fußbodenelementen **1** in ihrer Gänze, anhand der daran vorhandenen Koppelmittel, sowohl eine vertikale als auch eine horizontale Verriegelung mit anderen gleichartigen Fußbodenelementen **1** in dem Fußbodenbelag erzielt.

[0132] Der Unterschied zwischen beiden in Fig. 34 abgebildeten Fußbodenelementen **1** liegt in der Tatsache, dass die Koppelmittel **9A-10A** bei dem zweiten, rechts abgebildeten Fußbodenelement **1** im Vergleich zu den ersten, links abgebildeten Fußbodenelement **1** in gespiegelter Abfolge um die Teile **2-3-52-53** angeordnet sind. Die Koppelmittel **9-10**, die an der Basisstruktur **28** vorhanden sind, sind jedoch in gleicher Abfolge geordnet. Wie bekannt ist, beispielsweise aus WO 2004/063491, kann anhand von Fußbodenelementen, die eine gegenseitig gespiegelte Anordnung der Koppelmittel aufweisen, ein Fußbodenbelag mit einem Fischgratmotiv gebildet werden. Wie aus WO 2005/098163 hervorgeht, ist diese Eigenschaft jedoch keine notwendige Bedingung für das Formen eines Fischgratmotivs.

[0133] Fig. 35 zeigt, dass mit den Fußbodenelementen **1** aus Fig. 34 ebenfalls ein solcher Fußbodenbelag **54** gebildet werden kann, dass auch andere Motive, wie etwa das Blockmotiv aus Fig. 36, gebildet werden können. Dieses Blockmotiv wird einfach dadurch erreicht, indem die Bestandteile **2-3-52-53** in der gegenseitigen Position P1 angewendet werden, worin die Fußbodenelemente **1** eine global rechteckige Form, und in diesem Fall quadratische Form, aufweisen.

[0134] Es wird angemerkt, dass, in dem Fall, dass mindestens einer der Bestandteile **2** fest mit der Basisstruktur **28** verbunden ist, sei es mittels einer Leim- oder Klebeverbindung, oder durch die Tatsache, dass der betreffende Bestandteil **2** mindestens teilweise einteilig mit der Basisstruktur **28** ausgebildet ist, oder mittels mechanischer Koppelmittel, oder durch eine Kombination der vorangehenden Möglichkeiten, schon bereits anhand der Koppelmittel **9-10** der Basisstruktur **28** eine gute Verbindung in dem Fußbodenbelag **54** erhalten werden kann, da in einem solchen Fall jeweils Zonen **55** aneinander angeschlossener Bestandteile bestehen können, die mittels der Koppelmittel **9-10** der Basisstruktur **28** miteinander verbunden sind. Diese Zonen **55** sind in Fig. 35 anhand schraffierter Bestandteile **2** veranschaulicht. Auch in dem in Fig. 36 wiedergegebenen Fall eines Blockmotivs werden solche Zonen **55** erhalten. In Fällen, wo die Basisstruktur **28** an beiden Paaren gegenüberliegender Seiten **5-6-7-8** Koppelmittel **9-10** aufweisen, die zulassen, mit einer gleichartigen Basisstruktur **28** sowohl eine horizontale als auch vertikale Verriegelung zu bilden, können die Koppelmittel **9A-10A** der Bestandteile **2-3-52-53** an einem Paar oder an beiden Paaren von Seiten **5A-6A-7A-8A** auf Koppelmittel beschränkt werden, die beispielsweise lediglich eine horizontale, oder lediglich eine vertikale Verriegelung zulassen. Es ist

I4F Exhibit 1003 - 274

selbst möglich, beispielsweise an dem kurzen Paar Seiten **7A-8A** oder an dem langen Paar Seiten **5A-6A** der Bestandteile **2-3-52-53** die Koppelmittel **9A-10A** wegzulassen. Selbst wenn die Koppelmittel **9A-10A** der Bestandteile **2-3-52-53** auf ein Minimum beschränkt sind, wird anhand der Koppelmittel **9-10** der Basisstruktur **28** noch ein sehr guter Fußbodenbelag **54** erhalten, da die Bestandteile **2-3-52-53**, die frei auf der Basisstruktur **28** liegen, zwischen den Zonen **55** oder mit anderen Worten zwischen den Bestandteilen **2**, die fest mit dieser Basisstruktur **28** verbunden sind, festsitzen.

[0135] Fig. 37 gibt noch ein Beispiel von Fußbodenelementen **1** mit den Merkmalen des ersten Aspekts wieder, die zur Bildung eines Fußbodenbelags **54** mit Fischgratmotiv angewendet werden können. Das Besondere an dieser Ausführungsform ist, dass die Bestandteile **2-3-52-53** mit ihrer Längsrichtung L nicht gemäß der Basisstruktur **28** ausgerichtet sind, sondern mit den Hauptrichtungen der Basisstruktur **28** einen Winkel von in diesem Fall **45** Grad bilden. Dieser Ausführungsform bietet den Vorteil, dass ein Fußbodenbelag **54** mit einem Fischgratmotiv anhand solcher Fußbodenelemente **1** auf einfache Weise zusammengestellt werden kann. Durch das Ausrichten der Hauptrichtungen der Basisstruktur **28** zu den Wänden des Raums, worin der Fußbodenbelag **54** zu installieren ist, wird erhalten, dass auch das Fischgratmotiv zu diesen Wänden ausgerichtet ist.

[0136] Fig. 38 gibt ein Beispiel wieder, wobei ebenfalls eine Einheit **4** mittels einheitsbildender Mittel **14** zustande gebracht ist, in diesem Fall anhand einer Basisstruktur **28** oder Basisplatte. Wie aus der Figur deutlich hervorgeht, können die Bestandteile **2-3-52** mindestens zwei verschiedene gegenseitige Positionen P1-P2 einnehmen. Nämlich einerseits eine erste gegenseitige Position P1, die anhand des links in der Figur wiedergegebenen Fußbodenelements **1** veranschaulicht ist, worin das Fußbodenelement **1** eine global rechteckige Form aufweist, und andererseits mindestens eine zweite gegenseitige Position P2, die anhand des rechts in der Figur wiedergegebenen Fußbodenelements **1** veranschaulicht ist. Die Fußbodenelemente **1** können sowohl in der links, als auch in der rechts wiedergegebenen gegenseitigen Position P1 der Bestandteile **2-3-52** zum Zusammenstellen eines Fußbodenbelags **54** angewendet werden. Fig. 39 gibt ein Beispiel eines Fußbodenbelags **54** wieder, der anhand dieser Fußbodenelemente **1** zusammengestellt ist. Es ist deutlich, dass hierbei von der rechts in Fig. 38 abgebildeten Konfiguration der Bestandteile **2-3-52** Gebrauch gemacht wird.

[0137] Fig. 40 gibt noch ein Beispiel eines erfindungsgemäßen Fußbodenelements **1** wieder, wobei die Bestandteile **2-3-51**, wie mit den Pfeilen angegeben, in Längsrichtung und Breitenrichtung verschoben werden können.

[0138] Fig. 41 gibt thematisch einen Schritt in einem Verfahren zum Zusammenstellen von Fußbodenelementen **1** zu einem Fußbodenbelag **54** wieder. Hierbei wird von Fußbodenelementen **1** ausgegangen, die mindestens einen ersten Bestandteil **2** und einen zweiten Bestandteil **3** umfassen. Im vorliegenden Fall wird von Fußbodenelementen **1** vom Zweiplankentyp ausgegangen und kann anhand einheitsbildender Mittel **14**, in diesem Fall einer Basisstruktur **28**, die einteilig ausgeführt oder auf eine andere Weise fest mit einem Teil des ersten Bestandteils **2** verbunden ist, eine Einheit **4** auf Basis mindestens der vorgenannten Bestandteile **2-3** zustande gebracht werden. Der Schritt in dem Verfahren, der in Fig. 41 wiedergegeben ist, betrifft das Einbringen des ersten Bestandteils **2**, in diesem Fall mit Inbegriff der fest damit verbundenen Basisstruktur **28**, in die Ebene des Fußbodenbelags **54**. Dieser erste Schritt umfasst bevorzugt auch das Koppeln der Fußbodenelemente **1** mit bereits in dem Fußbodenbelag **54** vorhandenen Fußbodenelementen **1** anhand mechanischer Koppelmittel **9-10**, die an mindestens einem Paar **5-6** und bevorzugt zwei Paaren gegenüberliegender Kanten **5-6-7-8** der Fußbodenelemente **1** vorhanden sind. Dieses Koppeln kann auf an sich bekannte Weise stattfinden. So können beispielsweise hierzu die Verlegeverfahren angewendet werden, die aus DE 29 40 945, WO 94/26999, WO 01/02671, WO 2006/125646, EP 1 282 752 bekannt sind.

[0139] Fig. 42 veranschaulicht einen weiteren Schritt in diesem Verfahren, welches hierdurch die Merkmale des vorgenannten ersten möglichen Verfahrens aufweist. Nach dem Beispiel kann dieser Schritt mindestens in dem, ausgehend von einem ersten Bestandteil **2** und einem zweiten Bestandteil **3**, Zustandebringen einer solchen Einheit **4** oder solchen Fußbodenelements **1** und des in der letztendlichen Position in dem Fußbodenbelag **54** Anbringens sowohl des ersten Bestandteils **2** als auch des zweiten Bestandteils **3** bestehen. Die betreffende Einheit **4** wird in diesem Fall durch Anbringen des zweiten Bestandteils **3** auf der Basisstruktur **28** eines solchen Fußbodenelements **1** zustande gebracht. Es ist deutlich, dass zwischen dem ersten Bestandteil **2** und dem zweiten Bestandteil **3** keine eindeutige Beziehung bestehen muss. Damit ist beispielsweise gemeint, dass ein erster Bestandteil **2** und ein zweiter Bestandteil **3**, die zusammen verpackt wurden und eventuell eine Einheit **4** in der Verpackung bildeten, nicht unbedingt auch in dem Fußbodenbelag **54** zusammen eine Einheit **4** bilden müssen. Es ist schließlich möglich, dass sie in ihrer jeweiligen letztendlichen Position in dem Fußbodenbelag **54** mit anderen gleichartigen ersten Bestandteilen **2** oder zweiten Bestandteilen **3** solche Einheit **4** bilden.

[0140] Es wird angemerkt, dass in dem Beispiel der Fig. 40 und Fig. 41 der erste Bestandteil **2** bereits in dem mit Hilfe von Fig. 41 beschriebenen vorange-

I4F Exhibit 1003 - 275

henden Schritt in seine letztendlichen Position gebracht worden war.

[0141] Die Fig. 42 und Fig. 43 veranschaulichen aufeinanderfolgende Schritte in einer bevorzugten Ausführungsform eines derartigen Verfahrens. Hierbei werden der vorgenannte erste Bestandteil **2** und zweite Bestandteil **3**, wie in Fig. 43 veranschaulicht, als Einheit **4**, das heißt, zusammen, in dem Fußbodenbelag **54** angebracht, wonach, wie Fig. 44 wiedergibt, zum Erreichen ihrer jeweiligen Positionen die vorgenannte Einheit **4** verändert wird. Das Verändern der Einheit **4** bedeutet in diesem Fall eine Veränderung der gegenseitigen Position des zweiten Bestandteils **3** in Bezug zu dem ersten Bestandteil **2**. Wie in der Einleitung und in dem vorangehenden Teil der detaillierten Beschreibung besprochen, kann eine solche Veränderung der gegenseitigen Position P1-P2 auf vielerlei Weisen erreicht werden. Hierzu kann die vorgenannte Einheit **4** entweder zeitweilig aufgehoben oder nicht aufgehoben werden. Eine mögliche Veränderung ist in Fig. 44 mittels des Pfeils **56** angegeben und beinhaltet mindestens eine Schiebebewegung entlang dem ersten Bestandteil **2**. Hierbei befindet sich der zweite Bestandteil **3** möglicherweise in einer in Hinblick auf den ersten Bestandteil **2** geschwenkten Orientierung. Es wird angemerkt, dass unter anderem in diesem Fall die Anwendung eines Verriegelungssystems **38** mit den Merkmalen des zweiten und/oder des dritten Aspekts nützlich zum Aneinanderkoppeln der Bestandteile **2-3** verwendet werden kann.

[0142] Weiter wird angemerkt, dass sowohl in dem Beispiel der Fig. 40 und Fig. 41, als auch in dem Beispiel der Fig. 42 und Fig. 43 die einheitsbildenden Mittel **14** in den jeweiligen letztendlichen Positionen der Bestandteile **2-3** in dem Fußbodenbelag aktiv sind. Das heißt, dass auch in dem letztendlichen Fußbodenbelag **54** jeweils eine Einheit **4** zwischen mindestens einem ersten Bestandteil **2** und einem zweiten Bestandteil **3** besteht.

[0143] Es ist deutlich, dass die Fig. 42 und Fig. 43 auch ein Verfahren mit den Merkmalen des in der Einleitung genannten zweiten möglichen Verfahrens veranschaulichen. Hierzu werden mindestens der vorgenannte erste Bestandteil **2** und der vorgenannte zweite Bestandteil **3** in einer gegenseitigen Ausgangsposition P1 gemeinsam in der Ebene des Fußbodenbelags **54** angebracht. Danach werden die Bestandteile **2-3** aus dieser gegenseitigen Ausgangsposition P1 und in ihre jeweilige letztendliche gegenseitige Position P2 in dem Fußbodenbelag **54** gebracht. Hierbei erreicht der vorgenannte erste Bestandteil **2** in dem Beispiel früher seine letztendliche Position als der vorgenannte zweite Bestandteil **3**.

[0144] Es ist deutlich, dass jeder der vorgenannten Bestandteile **2-3** der Fußbodenelemente **1**, womit der Fußbodenbelag **54** gemäß den Fig. 41 bis Fig. 43 zusammengestellt wird, mit einer Zierseite **11** versehen sein kann, die in der letztendlichen Position des betreffenden Bestandteils **2-3** in dem Fußbodenbelag **54** dazu gedacht ist, einen Teil der Fußbodenoberfläche zu bilden. In solchem Fall kann, wie hier, ein Fußbodenbelag **54** erhalten werden, der Reihen **12** von Zierteilen **13** wiedergibt, wobei dieser Fußbodenbelag **54** mindestens eine erste Reihe **57** von Zierteilen **13** umfasst, die bevorzugt ausschließlich durch erste Bestandteile **2** gebildet wird, und auch mindestens eine zweite Reihe **58** von Zierteilen **13** umfasst, die bevorzugt ausschließlich durch zweite Bestandteile **3** gebildet wird, wobei die vorgenannte erste Reihe **57** und vorgenannte zweite Reihe **58** seitlich direkt nebeneinander liegen. In dem Beispiel der Figuren wird eine solche erste Reihe **57** jeweils mit einer solchen zweiten Reihe **58** abgewechselt.

[0145] Selbstverständlich können mit dem vorgenannten ersten und zweiten möglichen Verfahren auch andere Fußbodenbeläge **54** erhalten werden, wie beispielsweise die Fußbodenbeläge, die anhand der Fig. 35 und Fig. 39 veranschaulicht sind. Das Verfahren ist schematisch anhand der Pfeile in Fig. 35 veranschaulicht.

[0146] Im allgemeinen und unter Verweis auf Fig. 1 wird angemerkt, dass die vorgenannten Bestandteile **2-3-52-53** bevorzugt eine Breite B aufweisen, die bedeutend größer als die Dicke T des betreffenden Bestandteils **2-3-52-53** ist. Besser noch ist die Breite B größer als zwei oder drei Mal die Dicke T des Bestandteils **2-3-52-53**. Eine bevorzugte Breite B liegt beispielsweise zwischen fünf und 10 Zentimetern und ist noch besser größer als 6 Zentimeter.

[0147] Fig. 45 gibt ein Beispiel wieder, wobei die Breite B der Bestandteile **2-3-52-53** kleiner ist als ein Zehntel, in diesem Fall sogar kleiner ist als ein Zwanzigstel der Länge L1 der Bestandteile, und/oder im Verhältnis zur Länge der eventuellen Basisstruktur **28** dieselbe Breite B aufweist. In einer besonders nützlichen Ausführungsform weisen die Bestandteile **2-3-52-53** eine Breite B zwischen 5 und 8 Zentimetern, oder besser noch zwischen 6 und 7 Zentimetern auf, während dieser Bestandteil und/oder die eventuelle Basisstruktur **28** eine Länge L1 aufweist, die größer ist als 1 Meter, und besser noch größer ist als 1,20 Meter. Bevorzugt wird ausgehend von drei oder mehr dieser Bestandteile eine Einheit **4** gebildet, wobei mindestens einer und bevorzugt lediglich einer dieser Bestandteile **2** fest mit der Basisstruktur **28** verbunden ist. Auf diese Weise wird ein optimales Verhältnis zwischen der Handhabbarkeit der Einheit **4** und den Abmessungen der Bestandteile **2-3-52-53** erreicht, womit ein für den Benutzer sehr angenehmer Fußbodenbelag zusammengestellt werden kann. In jedem Beispiel sind vier Bestandteile **2-3-52-53** angewendet, die jedes an sich mehrere

I4F Exhibit 1003 - 276

Zierteile **13** wiedergeben können oder nicht. Es ist deutlich, dass die Bestandteile **2-3-52-53** des Fußbodenelements **1** in der Figur, außer der gegenseitigen Position P2, die dargestellt ist, auch mindestens eine gegenseitige Position P1, im Strichlinie wiedergegeben, einnehmen können, worin die globale Form des Fußbodenelements rechteckig und länglich ist. Weiter ist es deutlich, dass das abgebildete Fußbodenelement eine Verbesserung eines sogenannten Vierplankenelements bedeuten kann.

[0148] Wie Fig. 46 wiedergibt, können die Bestandteile **2-3-52-53** an sich und/oder die Fußbodenelemente **1** an einer oder mehreren Oberkanten **24** Abfasungen **59** oder Imitations-Abfasungen **59A** aufweisen. Abfasungen **59-59A** und Verfahren zu deren Anbringung oder Verwirklichung sind inzwischen zur Anwendung an verschiedenen Typen von Fußbodenelementen und Fußbodenpaneelen breit bekannt. Als Beispiel wird auf WO 01/96688 verwiesen, wo derartige Abfasungen für Laminatfußbodenpaneele vorgestellt werden.

[0149] Die Fig. 21, Fig. 25 und Fig. 26 der vorliegenden Anmeldung geben Beispiele einer Abfasung **59** wieder. Das betrifft in diesem Fall eine Abfasung **59** der Oberkanten **24** in Form einer Fase. Im Fall von Bestandteilen in Form eines Laminatpaneels können Abfasungen durch vielerlei Techniken angebracht werden. Sie können beispielsweise lediglich in dem gedruckten Dekor abgebildet werden, sie können durch das Wegnehmen von Material an der betreffenden Oberkante gebildet werden, sie können durch einen Eindruck gebildet werden, und dergleichen mehr. In dem Fall, in dem sie durch das Wegnehmen von Material an der betreffenden Oberkante gebildet werden, wird bevorzugt eine getrennte dekorative Lage auf der Abfasung vorgesehen.

[0150] Fig. 47 gibt ein Beispiel wieder, wobei die Bestandteile **2-3** an der Oberkante **24** mindestens an beiden Seiten **5A-6A** eines ersten Paares gegenüberliegenden Seiten, und bevorzugt, jedoch hier nicht wiedergegeben, auch an dem zweiten Paar gegenüberliegender Seiten **7A-8A**, mit einer Abfasung **59** versehen sind, die durch das Wegnehmen von Material gebildet ist. Die hierbei gebildete Oberfläche **60** erstreckt sich, wie wiedergegeben, bevorzugt durch die Toplage **19** und das Kernmaterial oder den Kern **18** des betreffenden Bestandteils **2-3**. Es ist jedoch nicht ausgeschlossen, dass solche Abfasung **59** auf die vorgenannte Toplage **19** beschränkt bleibt. Obwohl der hier wiedergegebene Bestandteil wie ein Laminatpaneel vom DPL-Typ aufgebaut ist, ist es nicht ausgeschlossen, dass solche Abfasungen **59** bei anderen der vorgenannten möglichen Toplagen **19** angewendet werden. Diese Technik kann beispielsweise auch besonders nützlich bei Toplagen sein, die aus Furnier bestehen. Die durch das Wegnehmen des Materials gebildete Oberfläche **60** ist mit einer getrennten dekorativen Lage **61** versehen, beispielsweise in Form einer ausgehärteten Substanz, wie etwa Lack, Tinte oder dergleichen, oder in Form eines mittels Transferdrucks angebrachten Aufdrucks.

[0151] Wenn die Zierseiten **11** der Bestandteile **2-3**, wie es unter anderem in den Fig. 1, Fig. 2, Fig. 7, Fig. 45 und Fig. 46 der Fall ist, an sich eine Reihe **12** von zwei oder mehr Zierteilen **13** wiedergeben, kann auf dem Übergang **62** zwischen diesen Zierteilen **13** auch eine Abfasung **59** oder Imitations-Abfasung **59A** anhand gleich welcher Technik vorgesehen werden. In dem Fall, dass die Bestandteile wie Laminatpaneele aufgebaut sind, können wieder die hier vorangehend genannten Techniken angewendet werden.

[0152] Fig. 48 gibt ein Beispiel wieder, wobei auf einen derartigen Übergang **62** eine Imitationsabfasung **59A** mittels eines Eindrucks **63** der Toplage **19** und eventuell des darunterliegenden Kernmaterials **18** angebracht ist. Es wird angemerkt, dass, wie unter anderem aus WO 2006/066776 bekannt ist, ein Presselement zum Anbringen eines derartigen Eindrucks **63** verwendet werden kann. Im Fall eines Bestandteils **2**, der wie ein Laminatpaneel aufgebaut ist, kann der Eindruck **63** mit dem Presselement, das für das Formen der Toplage **19** angewendet wird, angebracht werden. Es spricht für sich, dass die Bestandteile **2-3-51-53** auch andere Aussparungen in der oberen Fläche oder Zierseite **11** aufweisen können, entweder in Form von Eindrücken oder nicht. Beispielsweise können im Fall von Bestandteilen **2-3**, die wie Laminatpaneele aufgebaut sind, Techniken zum Erzeugen von Eindrücken, die eine Holzstruktur imitieren, angewendet werden. Solche Techniken sind beispielsweise aus WO 2001/096689 oder dem oben genannten WO 2006/066776 bekannt. Weiter gibt Fig. 46 wieder, dass auch die kurzen Seiten **7A-8A** der Bestandteile **3-52-53** mit einer Abfasung **59** versehen werden können. In dem dargestellten Beispiel betrifft dies eine Abfasung **59**, die durch das Wegnehmen von Material und das vorsehen einer getrennten Bekleidung **61** auf der erhaltenen Oberfläche **60** erhalten ist.

[0153] Im allgemeinen wird angemerkt, dass Abfasungen **59** oder Imitations-Abfasungen **59A** infolge der Tatsache, dass eine Einheit **4** ausgehend von Bestandteilen **2-3** bei Fußbodenelementen **1** gebildet wird, erfindungsgemäß in vielerlei Hinsicht einfacher vorgesehen werden können als bei Fußbodenelementen des Standes der Technik.

[0154] Wie bereits eher vermeldet, ist bei Fußbodenelementen **1**, wie etwa dem in den Fig. 45 bis Fig. 48 abgebildeten, bevorzugt mindestens einer der Bestandteile **2** fest mit der Basisstruktur **28** verbunden, beispielsweise anhand einer Leimverbindung **64**, die als Beispiel in Fig. 47 schematisch als

I4F Exhibit 1003 - 277

ein Linienstück wiedergegeben ist.

[0155] Es wird angemerkt, dass in dem Fall, dass die Basisstruktur aus einer Platte besteht, beispielsweise so wie in den Fig. 7-Fig. 10, Fig. 15-Fig. 16, Fig. 20, Fig. 31, Fig. 34-Fig. 40 und Fig. 45-Fig. 48, derartige Ausführungsform auch definiert werden können als ein Fußbodenelement darstellend, mit dem Merkmal, dass es mindestens eine durch eine Platte gebildete Basisstruktur umfasst, sowie mindestens zwei an ihren Kanten miteinander koppelbare Bestandteile umfasst, die jeder aus einem Fußbodenpaneel bestehen, wovon mindestens ein erster Bestandteil fest auf der Basisplatte befestigt ist, während mindestens ein zweiter der vorgenannten Bestandteile verlagerbar ist und damit verschiedene Positionen in Hinblick auf den ersten Bestandteil einnehmen kann. Selbstverständlich bezieht die Erfindung sich dann auch auf alle Ausführungsformen, die unter diese unabhängige Porträtdefinition fallen. Es ist auch deutlich, dass die Erfindung sich auch auf Ausführungsformen bezieht, die die vorgenannte Porträtdefinition erfüllen und die weiter ein oder mehrere zusätzliche untergeordnete Merkmale aufweisen, die anhand der vorangehenden Ausführungsformen beschrieben worden sind.

[0156] Weiter wird angemerkt, dass dort, wo von einem Bestandteil die Rede ist, der frei auf einer Basisstruktur liegt, mit „frei" in den Fällen gemeint ist, dass dieser Bestandteil **3** in Hinblick auf die Basisstruktur **28** verlagert oder verschoben werden kann und eventuelle zeitweilige Befestigungsmittel, wie etwa eine lösbare Leimverbindung, zwischen dem Bestandteil **3** und der Basisstruktur somit nicht ausgeschlossen werden. Auch ist es nicht ausgeschlossen, dass Bestandteile **3**, die in Hinsicht auf eine Basisstruktur **28**, wie etwa eine Platte, verschoben werden können, in ihrer letztendlichen Position fest mit der Basisstruktur verbunden werden, beispielsweise mittels einer Leimverbindung.

[0157] In Bezug auf die in den Figuren, beispielsweise in den Fig. 15 und Fig. 45, wiedergegebenen Basisstrukturen **28** oder Basisplatten wird angemerkt, dass sie nicht an eine bestimmte Dicke gebunden sind, sondern im Verhältnis zu den Bestandteilen **2-3** sowohl dicker als auch dünner ausgeführt werden können als wiedergegeben.

[0158] Fig. 49 stellt noch ein mögliches Verriegelungssystem dar, das beispielsweise an den Seiten, insbesondere an den langen Seiten **5-6**, der Bestandteile eines erfindungsgemäßen Fußbodenelements **1** angewandt werden kann. Insbesondere sind die dargestellten Koppelmittel zur Anwendung an den langen Seiten **5-6** von Fußbodenelementen **1** des Typs, wie in Fig. 45 dargestellt, geeignet. Die Koppelmittel bestehen im Wesentlichen aus einer Feder **9A** und einer Nut **10A**, die mit Verriegelungsmitteln **41** versehen sind, sodass beim Koppeln zweier Fußbodenelemente **1** oder deren Bestandteilen **2-3** sowohl eine horizontale als auch eine vertikale Verriegelung zwischen den betreffenden Seiten der Fußbodenelemente oder Bestandteile entsteht. Die hier wiedergegebenen Koppelmittel **41** lassen zu, dass die Feder **9A** mindestens mit einer Schwenkbewegung W um die Oberkanten **24** in die Nut **10A** gebracht werden kann. Im dargestellten Fall ist solche Schwenkbewegung W die einzige Bewegung, womit die Koppelmittel ineinander angebracht werden können. In Strichlinie ist dargestellt, dass das Federpaneel **3** relativ hoch aufgeschwenkt werden muss, bevor die Verbindung völlig gelöst ist, was gestattet, ein etwas hochgeschwenktes Federpaneel **3** in der Längsrichtung L der Nut **10A** entlang den betreffenden Seiten zu schieben, ohne dass die Verbindung sich vollständig löst. Es versteht sich, dass diese Eigenschaft besonders interessant zur Erzielung einer flotten Installation der Bestandteile **2-3** in den Fußbodenelementen **1** der vorliegenden Erfindung gemäß einigen bevorzugten Ausführungsformen davon ist.

[0159] Eine besondere, nicht wiedergegebene Variante eines Fußbodenelements gemäß dem ersten Aspekt der Erfindung betrifft ein Fußbodenelement, wobei mindestens einer der vorgenannten Bestandteile an sich aus mehreren Elementen zusammengestellt ist. In dem Beispiel von Fig. 1, Fig. 7 oder Fig. 45 könnte es beispielsweise sein, dass ein Bestandteil **2**, der eine Reihe **12** von Zierteilen **13** wiedergibt, aus Elementen zusammengestellt ist, die jedes an sich beispielsweise nur ein Zierteil wiedergeben. Diese Elemente können zur Bildung des betreffenden Bestandteils entweder lösbar miteinander verbunden sein oder nicht. Beispielsweise können sie, bevorzugt lösbar, anhand mechanischer Koppelmittel verbunden sein, die sowohl eine vertikale als auch eine horizontale Verriegelung zwischen den Elementen zustande bringen. Solche Koppelmittel können von den Typ sein, wie in den Fig. 3 bis Fig. 6 wiedergegeben. Bevorzugt sollen solche Elemente eine gegenseitig unterschiedliche Länge aufweisen oder im Vergleich mit anderen Elementen, die dazu gedacht sind, in denselben Fußbodenbelag aufgenommen zu werden, eine unterschiedliche Länge aufweisen. Beispielsweise kann mit drei verschiedenen Längen gearbeitet werden. Aus EP 1 437 456 ist es schließlich bekannt, dass mit Zierteilen verschiedener Längen verschiedene Vorteile erzielt werden können.

[0160] Gemäß einer anderen, nicht wiedergegebenen Variante des ersten Aspekts der Erfindung weisen die Bestandteile ein und desselben Fußbodenelements mindestens ein Paar Koppelmittel auf, die eine Koppelung in horizontaler und vertikaler Richtung mittels einer Abwärtsbewegung zulassen. Solche Kopplung ist besser bekannt als ein „Pushlock" ist an sich beispielsweise aus WO 00/47841 bekannt.

I4F Exhibit 1003 - 278

[0161] Noch eine andere Variante ist in Fig. 50 dargestellt. In diesem Beispiel weisen die Bestandteile **2-3** ein und desselben Fußbodenelements **1** mindestens ein Paar Koppelmittel auf, die eine Kopplung in horizontaler Richtung H1 mittels einer Abwärtsbewegung N zulassen, ohne dass von einer vertikalen Verbindung die Rede ist. Solche Kopplung ist besser als eine „Drop"- oder Kipp-Verbindung bekannt und kann bei den Fußbodenelementen **1** der vorliegenden Erfindung bevorzugt an den kurzen Seiten **7A-8A** der Bestandteile **2-3** angewendet werden. Das hier dargestellte Beispiel für eine solche Drop-Verbindung weist auch die besondere Eigenschaft auf, dass das männliche Koppelteil **30A** nicht nur mit einer Abwärtsbewegung N, sondern auch mit einer horizontalen Schiebebewegung S in dem weiblichen Koppelteil **31A** angebracht werden kann. Diese Eigenschaft lässt zu, dass die Einzelteile **2-3**, bevorzugt an ihren kurzen Seiten **7A-8A**, auch an schwierig erreichbaren Stellen, wie etwa unter überhängenden Schränken und Heizkörpern, einfach ineinandergefügt werden können. Bevorzugt wird in solchem Fall der betreffende Bestandteil **2-3** an seinen langen Seiten **5-6** dadurch geführt, dass er bereits mit angrenzenden Bestandteilen **2-3** verbunden ist.

[0162] Fig. 50 gibt ebenfalls anhand des Pfeils **65** deutlich wieder, dass bevorzugt mindestens beim Ausführen der vorgenannten horizontalen Schiebebewegung S eine elastische Verformung des weiblichen Koppelteils **31A** stattfindet. Es ist nicht ausgeschlossen, dass in dem gekoppelten Zustand des männlichen Koppelteils **30A** und des weiblichen Koppelteils **31A** noch stets eine Verbiegung des betreffenden Teils des weiblichen Koppelteils **31A** vorliegt.

[0163] Die in Fig. 50 wiedergegebenen Koppelmittel können auch bei anderen Fußbodenelementen **1** angewendet werden als bei Fußbodenelementen **1**, die die Merkmale des ersten Aspekts und/oder der vorgenannten Porträtdefinition aufweisen. Sie können vor allem günstig bei schmalen Paneelen, wie etwa Laminatpaneelen, angewendet werden, beispielsweise bei Paneelen mit einer Breite B, die kleiner ist als 16 Zentimeter, bevorzugt kleiner ist als 10 oder sogar kleiner als 8 Zentimeter. Es ist deutlich, dass die hier dargestellten Koppelmittel ein Verriegelungssystem mit den Merkmalen des in der Einleitung genannten vierten Aspekts der vorliegenden Erfindung bilden.

[0164] Die vorliegende Erfindung ist keineswegs auf die als Beispiel beschriebenen und in den Figuren dargestellten Ausführungsformen beschränkt, vielmehr können derartige Fußbodenelemente gemäß verschiedenen Varianten verwirklicht werden, ohne den Rahmen der Erfindung zu verlassen.

Schutzansprüche

1. Fußbodenelement des Typs, der an mindestens zwei gegenüberliegenden Kanten (**5-6**) Koppelmittel (**9-10**) aufweist, die gestatten, dass zwei solcher Fußbodenelemente (**1**) an den betreffenden Kanten (**5-6**) miteinander zusammenwirken können, **dadurch gekennzeichnet**, dass das Fußbodenelement (**1**) mindestens zwei Bestandteile (**2-3**) umfasst, sowie mindestens einheitsbildende Mittel (**14**) umfasst, die, ausgehend von den vorgenannten Bestandteilen (**2-3**) eine Einheit (**4**) zustande bringen können, wobei die vorgenannten Bestandteile (**2-3**) mindestens zwei gegenseitige Positionen (P1-P2) einnehmen können, entweder mittels oder nicht mittels Aufhebung der durch die vorgenannten einheitsbildenden Mittel (**14**) zustande gebrachten Einheit (**4**).

2. Fußbodenelement nach Anspruch 1, dadurch gekennzeichnet, dass die vorgenannten Bestandteile (**2-3**) in Bezug zueinander verschoben werden können.

3. Fußbodenelement nach Anspruch 1 oder 2, dadurch gekennzeichnet, dass die vorgenannten Bestandteile (**2-3**) als Platten, spezieller Paneele, oder Planken ausgeführt sind.

4. Fußbodenelement nach Anspruch 2 und 3, dadurch gekennzeichnet, dass die vorgenannten Bestandteile (**2-3**) in ihrer Längs- und/oder Breitenrichtung in Bezug zueinander verschoben werden können.

5. Fußbodenelement nach einem der vorgenannten Ansprüche, dadurch gekennzeichnet, dass jeder der vorgenannten Bestandteile (**2-3**) eine im Wesentlichen flache Seite aufweist, die eine Zierseite (**11**) bildet, und dass diese Zierseite (**11**) sich mindestens teilweise an der Oberseite des Fußbodenelements (**1**) befindet.

6. Fußbodenelement nach einem der vorgenannten Ansprüche, dadurch gekennzeichnet, dass die vorgenannten einheitsbildenden Mittel (**14**) ausgehend von den vorgenannten Bestandteilen (**2-3**) eine solche Einheit (**4**) zustande bringen können, dass diese Einheit (**4**) mindestens in den vorgenannten zwei gegenseitigen Positionen (P1-P2) der Bestandteile (**2-3**) vorhanden ist.

7. Fußbodenelement nach Anspruch 6, dadurch gekennzeichnet, dass beim Verändern von der einen gegenseitigen Position (P1) zu der anderen gegenseitigen Position (P2) der vorgenannten Bestandteile (**2-3**) die vorgenannte Einheit (**4**) erhalten bleibt.

8. Fußbodenelement nach einem der Ansprüche 1 bis 6, dadurch gekennzeichnet, dass die vorge-

I4F Exhibit 1003 - 279

nannten Mittel (**14**) eine solche Einheit (**4**) zwischen den vorgenannten Bestandteilen (**2-3**) zustande bringen können, dass beim Verändern von der einen gegenseitigen Position (P1) zu der anderen gegenseitigen Position (P2) dieser Bestandteile (**2-3**) die vorgenannte Einheit (**4**) aufgehoben wird.

9. Fußbodenelement nach Anspruch 8, dadurch gekennzeichnet, dass die Mittel (**14**), die die vorgenannte Einheit (**4**) zustande bringen, so ausgeführt sind, dass ein eventuelles Aufheben der Einheit (**4**) beim Erreichen der vorgenannten zweiten Position (P2) und/oder beim Zurückkehren zu der vorgenannten ersten Position (P1) rückgängig gemacht werden kann.

10. Fußbodenelement nach Anspruch 8, dadurch gekennzeichnet, dass die Mittel (**14**), die die vorgenannte Einheit (**4**) zustande bringen, so sind, dass ein eventuelles Aufheben dieser Einheit (**4**) unwiderruflich ist.

11. Fußbodenelement nach einem der vorgenannten Ansprüche, dadurch gekennzeichnet, dass die vorgenannten einheitsbildenden Mittel (**14**) mindestens aus mechanischen Koppelmitteln (**9A-10A**) bestehen, die sich an mindestens einer Seite (**5A-6A**) von jedem der vorgenannten Bestandteile (**2-3**) befinden, wobei diese mechanischen Koppelmittel (**9A-10A**) zulassen, dass die betreffenden Seiten (**5A-6A**) der vorgenannten Bestandteile (**2-3**) miteinander zusammenwirken können.

12. Fußbodenelement nach Anspruch 11, dadurch gekennzeichnet, dass die vorgenannten mechanischen Koppelmittel (**9A-10A**) der Bestandteile (**2-3**), die Teil der einheitsbildenden Mittel (**14**) sind, anders ausgeführt sind als die mechanischen Koppelmittel (**9-10**), die das Fußbodenelement (**1**), wie vorgenannt, an mindestens zwei gegenüberliegenden Kanten (**5-6**) davon aufweist.

13. Fußbodenelement nach Anspruch 11 oder 12, dadurch gekennzeichnet, dass die vorgenannten mechanischen Koppelmittel (**9A-10A**) der Bestandteile (**2-3**), die Teil der einheitsbildenden Mittel (**14**) sind, an den betreffenden Seiten (**5A-6A**) eine Verriegelung in einer vertikalen Richtung (V1) senkrecht zur Ebene des Fußbodenelements (**1**) und/oder in einer horizontalen Richtung (H1) senkrecht zu den vorgenannten Seiten (**5A-6A**) und in der Ebene des Fußbodenelements (**1**) zustande bringen können.

14. Fußbodenelement nach Anspruch 13, dadurch gekennzeichnet, dass die vorgenannten mechanischen Koppelmittel (**9A-10A**) der Bestandteile (**2-3**), die Teil der einheitsbildenden Mittel (**14**) sind, so ausgeführt sind, dass sie zulassen, dass die betreffenden Bestandteile (**2-3**) miteinander gekoppelt und/oder voneinander gelöst werden können, indem ein erster der vorgenannten Bestandteile (**3**) an der betreffenden Seite (**5A**) mittels einer Schwenkbewegung (W) um die betreffende Seite (**5A**) in einen anderen, beziehungsweise aus einem anderen der vorgenannten Bestandteile (**2**) bewegt wird.

15. Fußbodenelement nach einem der vorgenannten Ansprüche, dadurch gekennzeichnet, dass die vorgenannten einheitsbildenden Mittel (**14**) mindestens aus einem Teil des Fußbodenelements (**1**) bestehen, der sich an der Unterseite des Fußbodenelements (**1**) befindet und der seinerseits mindestens einen vorragenden Teil bildet, der sich ab einem ersten Bestandteil (**2**) dieses Fußbodenelements (**1**) mindestens unter einem zweiten Bestandteil (**3**) erstreckt oder erstrecken kann, wobei bevorzugt der vorspringende Teil mindestens eine Fläche einnimmt, die nahezu gleich der Fläche des zweiten Bestandteils (**3**) ist oder größer ist.

16. Fußbodenelement nach Anspruch 15, dadurch gekennzeichnet, dass der vorgenannte, an der Unterseite befindliche Teil eine Basisstruktur (**28**) bildet und dass diese Basisstruktur (**28**) einteilig mit dem ersten Bestandteil (**2**) ausgeführt ist oder mit anderen Worten ein Teil dieses Bestandteils (**2**) ist, sodass dann eigentlich der erste Bestandteil (**2**) sich mit dem vorgenannten vorragenden Teil bis unter ein oder mehrere andere Bestandteile (**3**) erstreckt oder erstrecken kann.

17. Fußbodenelement nach Anspruch 15, dadurch gekennzeichnet, dass der vorgenannte, an der Unterseite befindliche Teil eine Basisstruktur (**28**) bildet und dass diese Basisstruktur als eine separate Basisplatte oder Basisschicht ausgeführt ist, worauf dann der erste Bestandteil (**2**) fest befestigt ist, wobei diese Basisplatte oder Basisschicht mit dem vorgenannten vorragenden Teil über diesen ersten Bestandteil (**2**) hinausragt.

18. Fußbodenelement nach einem der vorgenannten Ansprüche, dadurch gekennzeichnet, dass die vorgenannten einheitsbildenden Mittel (**14**) mindestens aus einem separaten Befestigungsmittel bestehen, das die vorgenannten Bestandteile (**2-3**) verbinden kann.

19. Fußbodenelement nach einem der vorgenannten Ansprüche, dadurch gekennzeichnet, dass die vorgenannten einheitsbildenden Mittel (**14**) mindestens aus einer entweder lösbaren oder nicht lösbaren Klebe- oder Leimverbindung (**26**) oder einem separaten mechanischen Koppelteil (**25**) bestehen.

20. Fußbodenelement nach einem der vorgenannten Ansprüche, dadurch gekennzeichnet, dass mindestens einer, und bevorzugt jeder der vorgenannten Bestandteile (**2-3**) einen Kern (**18**) und eine darauf angebrachte Toplage (**19**) aufweist, wobei die-

I4F Exhibit 1003 - 280

se Toplage (**19**), oder zumindest doch ein Teil dieser Toplage (**19**), eine Zierseite (**11**) bildet, die sich mindestens teilweise an der Oberseite des Fußbodenelements (**1**) befindet.

21. Fußbodenelement nach Anspruch 20, dadurch gekennzeichnet, dass die vorgenannte Toplage (**19**) eine Toplage auf Basis von Kunststoff betrifft, die ein gedrucktes Dekor umfasst, wobei die vorgenannte Toplage (**19**) bevorzugt eine Laminattoplage betrifft, die anhand eines DPL(Direct Pressure Laminate)- oder HPL(High Pressure Laminate)-Verfahrens hergestellt ist.

22. Fußbodenelement nach Anspruch 20, dadurch gekennzeichnet, dass die vorgenannte Toplage (**19**) eine Toplage auf Basis von Holz betrifft, wobei vorzugsweise die Holzstruktur das Aussehen der vorgenannten Zierseite (**11**) bestimmt.

23. Fußbodenelement nach Anspruch 22, dadurch gekennzeichnet, dass die vorgenannte Toplage (**19**) ein Furnier oder eine Lage Holz, die dicker als Furnier ist, betrifft.

24. Fußbodenelement nach Anspruch 19, dadurch gekennzeichnet, dass die vorgenannte Toplage (**19**) eine Toplage auf Basis eines Materials betrifft, gewählt aus der Gruppe von Textil, Teppich, Kork, Vinyl, Keramik, Naturstein, Kunststein, Backstein.

25. Fußbodenelement nach einem der Ansprüche 20 bis 24, dadurch gekennzeichnet, dass der vorgenannte Kern (**18**) des betreffenden Bestandteils (**2-3**) ein Material auf Holzbasis umfasst.

26. Fußbodenelement nach Anspruch 25, dadurch gekennzeichnet, dass das vorgenannte Material auf Holzbasis MDF oder HDF betrifft.

27. Fußbodenelement nach Anspruch 25 oder 26, dadurch gekennzeichnet, dass das vorgenannte Material auf Holzbasis massives Weichholz betrifft, wie etwa Fichtenholz.

28. Fußbodenelement nach einem der vorgenannten Ansprüche, dadurch gekennzeichnet, dass die vorgenannten Bestandteile (**2-3**) eine gegenseitige Position (P1-P2) einnehmen können, worin das Fußbodenelement (**1**) eine global rechteckige Form aufweist.

29. Fußbodenelement nach einem der vorgenannten Ansprüche, dadurch gekennzeichnet, dass die vorgenannten Bestandteile (**2-3**) jeder eine gleichförmige und gleich große Zierseite (**11**) aufweisen.

30. Fußbodenelement nach einem der vorgenannten Ansprüche, dadurch gekennzeichnet, dass die vorgenannten Bestandteile (**2-3**) eine Zierseite (**11**) mit einer rechteckigen länglichen Form aufweisen, wobei die vorgenannte Einheit (**4**) derart ist, dass die Zierseiten (**11**) der vorgenannten Bestandteile (**2-3**) mindestens in den vorgenannten zwei gegenseitigen Positionen (P1-P2) mit ihren Längsrichtungen (L) nebeneinander positioniert werden können.

31. Fußbodenelement nach Anspruch 30, dadurch gekennzeichnet, dass die vorgenannten, an ihren Kanten koppelbaren Bestandteile (**2-3**) länglich sind und jeder Bestandteil (**2-3**) eine Zierseite aufweist, die, in der Breite (B) solchen Bestandteils (**2-3**) gesehen, das Aussehen einer einzigen Planke hat und in der Länge gesehen das Aussehen einer oder mehrerer Planken hat.

32. Fußbodenelement nach Anspruch 31, dadurch gekennzeichnet, dass an ein und demselben Fußbodenelement (**1**) Bestandteile (**2-3**) kombiniert werden, deren Zierseiten (**11**) eine unterschiedliche Anzahl hölzerner Zierteile (**13**) aufweisen, spezieller Bestandteile, die in der Länge gesehen das Aussehen einer unterschiedlichen Anzahl Planken haben.

33. Fußbodenelement nach Anspruch 31 oder 32, dadurch gekennzeichnet, dass, in dem Fall, dass ein und derselbe Bestandteil (**2-3**) das Aussehen mehrerer Planken hat, der Übergang (**62**) zwischen diesen Planken durch eine Abfasung (**59**) oder eine Imitations-Abfasung (**59A**) gebildet wird.

34. Fußbodenelement nach einem der Ansprüche 30 bis 33, dadurch gekennzeichnet, dass die vorgenannten Bestandteile (**2-3**) an den Oberkanten (**24**) ihrer gegenüberliegenden langen und/oder kurzen Seiten mit Abfasungen (**59**) versehen sind.

35. Fußbodenelement nach einem der vorgenannten Ansprüche, dadurch gekennzeichnet, dass die vorgenannten Bestandteile (**2-3**) rechteckig sind und dass sie mindestens an ihren langen Seiten (**5-6**) mit Koppelmitteln versehen sind, die zulassen, dass zwei solcher Bestandteile (**2-3**) sowohl in einer vertikalen Richtung (V1) senkrecht zur Ebene der gekoppelten Bestandteile als auch in einer horizontalen Richtung (H1) senkrecht zu den betreffenden Seiten und in der Ebene der Bestandteile (**2-3**) aneinandergekoppelt werden können.

36. Fußbodenelement nach Anspruch 35, dadurch gekennzeichnet, dass die vorgenannten Koppelmittel zulassen, dass zwei solcher Bestandteile (**2-3**) anhand einer Schwenkbewegung (W) um ihre Oberkanten (**24**) miteinander gekoppelt werden können.

37. Fußbodenelement nach einem der vorge-

I4F Exhibit 1003 - 281

nannten Ansprüche, dadurch gekennzeichnet, dass die vorgenannten Bestandteile (**2-3**) rechteckig sind und dass sie mindestens an ihren kurzen Seiten (**7A-8A**) mit Koppelmitteln versehen sind, die zulassen, dass zwei solcher Bestandteile mindestens in einer horizontalen Richtung (H1) senkrecht zu den betreffenden Seiten und in der Ebene der Bestandteile aneinandergekoppelt werden können.

38. Fußbodenelement nach Anspruch 37, dadurch gekennzeichnet, dass die vorgenannten Fußbodenelemente ein männliches Koppelteil (**30A**) und ein weibliches Koppelteil (**31A**) umfassen, die sich an den Kanten der zu koppelnden Bestandteile (**2-3**) befinden, wobei die vorgenannten Koppelteile mit Verriegelungsmitteln (**41**) versehen sind, die in einem gekoppelten Zustand einer kurzen Seite (**7A-8A**) eines ersten Bestandteils und einer kurzen Seite eines zweiten Bestandteils eine Verriegelung der Bestandteile in einer horizontalen Richtung (H1) senkrecht zu den gekoppelten kurzen Seiten in der Ebene der Bestandteile zustande bringen, wobei diese Koppelteile jedoch frei von Verriegelungsmitteln sind, die beim Koppeln an die betreffende Seite eine Verriegelung in einer vertikalen Richtung (V1) senkrecht zur Ebene der gekoppelten Bestandteile zustande bringen, wobei der vorgenannte gekoppelte Zustand anhand der vorgenannten Koppelteile wahlweise erhalten werden kann, entweder indem das vorgenannte männliche Koppelteil (**30A**) des ersten Bestandteils mit einer im Wesentlichen abwärtsgerichteten Bewegung (N) in dem weiblichen Koppelteil (**31A**) des zweiten Bestandteils angebracht wird, oder indem die Bestandteile mit den Kanten, die mit den vorgenannten Koppelteilen versehen sind, mit einer im Wesentlichen horizontalen Schiebebewegung (S) aufeinander zu bewegt werden.

39. Fußbodenelement, dadurch gekennzeichnet, dass es mindestens eine durch eine Platte gebildete Basisstruktur (**28**) umfasst, sowie mindestens zwei an ihren Kanten miteinander koppelbare Bestandteile (**2-3**) umfasst, die jeder aus einem Fußbodenpaneel bestehen, wovon mindestens ein erster Bestandteil (**2**) fest auf der Basisplatte (**28**) befestigt ist, während mindestens ein zweiter der vorgenannten Bestandteile (**3**) verlagerbar ist und somit verschiedene Positionen (P1-P2) in Bezug zu dem ersten Bestandteil (**2**) einnehmen kann.

40. Fußbodenelement nach Anspruch 39, dadurch gekennzeichnet, dass die vorgenannten Bestandteile (**2-3**) eine Zierseite (**11**) mit einer rechteckigen länglichen Form aufweisen, wobei mindestens die langen Kanten (**5-6**) der Bestandteile (**2-3**) aneinanderkoppelbar sind und wobei die jeweiligen Zierseiten (**11**) der vorgenannten Bestandteile (**2-3**) mindestens in den vorgenannten zwei verschiedenen Positionen (P1-P2) mit ihren Längsrichtungen (L) nebeneinander positioniert sind.

41. Fußbodenelement nach einem der Ansprüche 39 oder 40, dadurch gekennzeichnet, dass die vorgenannten, an ihren Kanten koppelbaren Bestandteile (**2-3**) länglich sind und jeder Bestandteil eine Zierseite (**11**) aufweist, die, in der Breite (B) solchen Bestandteils gesehen, das Aussehen einer einzigen Planke hat und in der Länge (L) gesehen das Aussehen von einer oder mehreren Planken hat.

42. Fußbodenelement nach Anspruch 41, dadurch gekennzeichnet, dass an ein und demselben Fußbodenelement (**1**) Bestandteile (**2-3**) kombiniert werden, die eine unterschiedliche Anzahl hölzerner Zierteile (**13**) aufweisen, spezieller Bestandteile (**2-3**), die in der Länge (L) gesehen das Aussehen einer unterschiedlichen Anzahl Planken haben.

43. Fußbodenelement nach Anspruch 41 oder 42, dadurch gekennzeichnet, dass, in dem Fall, dass ein und derselbe Bestandteil (**2-3**) das Aussehen mehrerer Planken hat, der Übergang (**62**) zwischen diesen Planken durch eine Abfasung (**59**) oder eine Imitations-Abfasung (**59A**) gebildet wird.

44. Fußbodenelement nach einem der Ansprüche 40 bis 43, dadurch gekennzeichnet, dass die vorgenannten Bestandteile (**2-3**) an den Oberkanten (**24**) ihrer gegenüberliegenden langen und/oder kurzen Seiten mit Abfasungen (**59**) versehen sind.

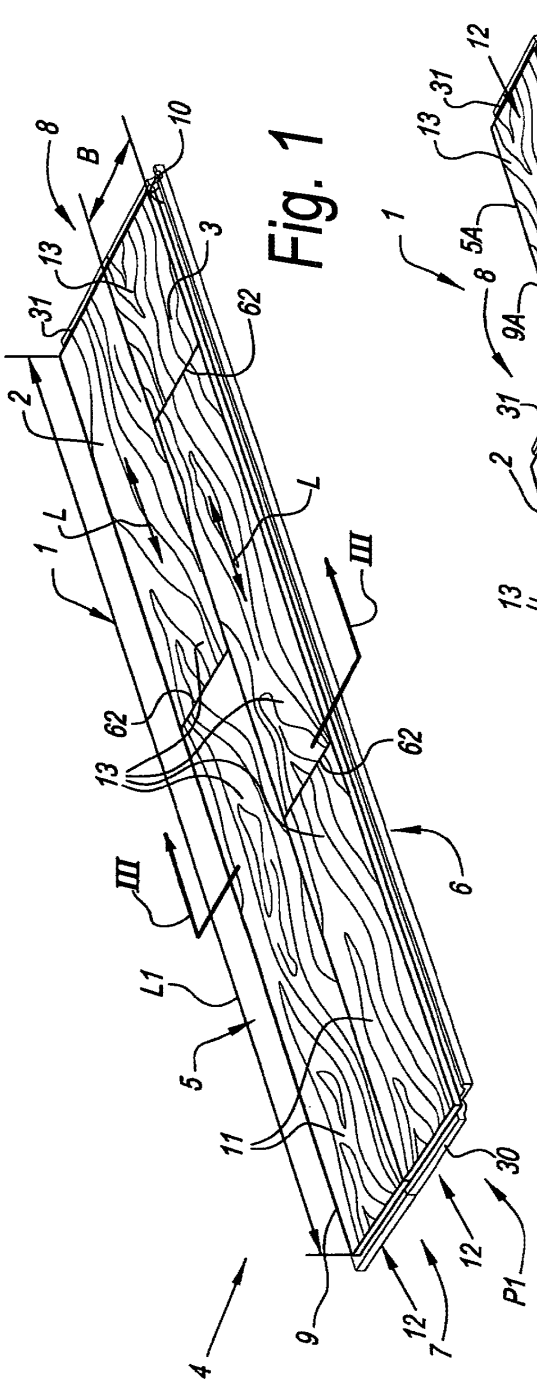
45. Fußbodenelement nach einem der Ansprüche 40 bis 43, dadurch gekennzeichnet, dass alle Bestandteile (**2-3**) ein und desselben Fußbodenelements dieselbe Länge aufweisen und bevorzugt auch dieselbe Breite aufweisen.

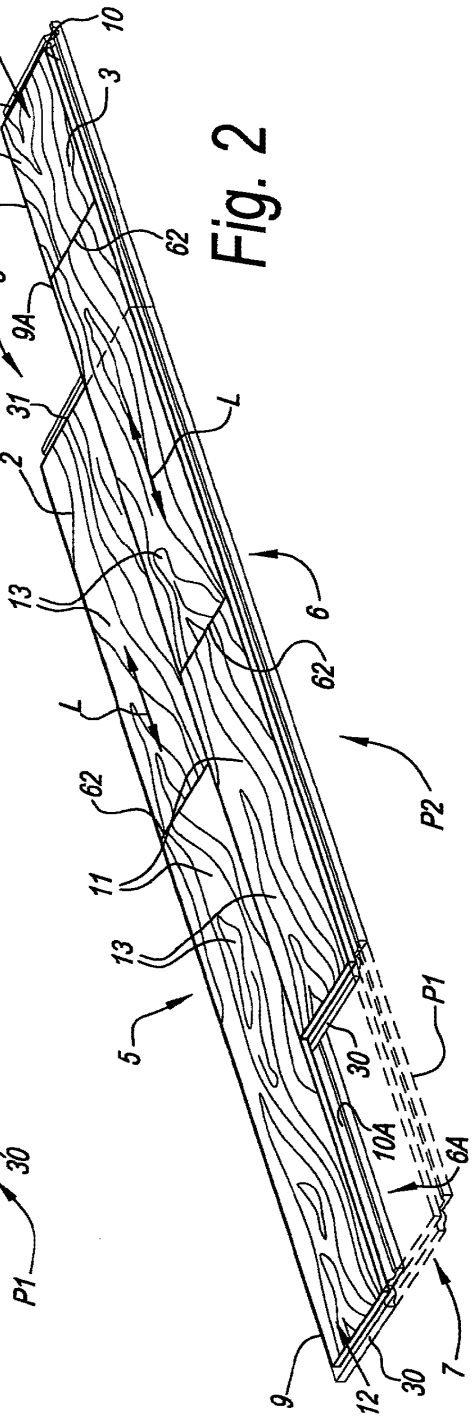
46. Fußbodenbelag, dadurch gekennzeichnet, dass er anhand von Fußbodenelementen mit den Merkmalen eines der vorgenannten Ansprüche zusammengestellt ist.

Es folgen 16 Blatt Zeichnungen

I4F Exhibit 1003 - 282

Anhängende Zeichnungen





I4F Exhibit 1003 - 283

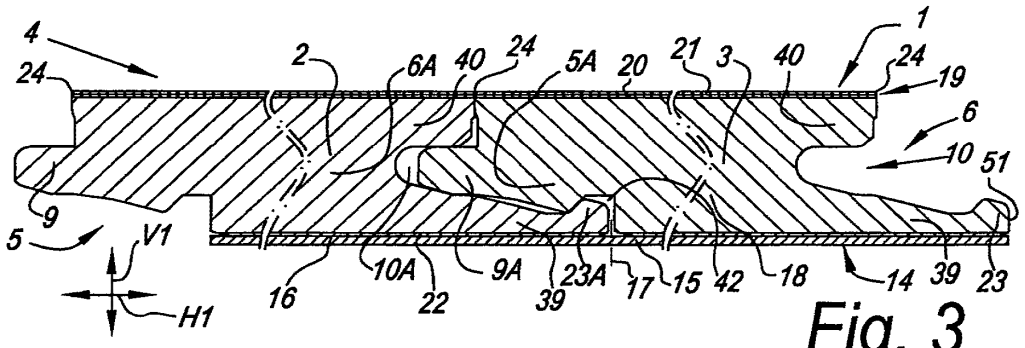


Fig. 3

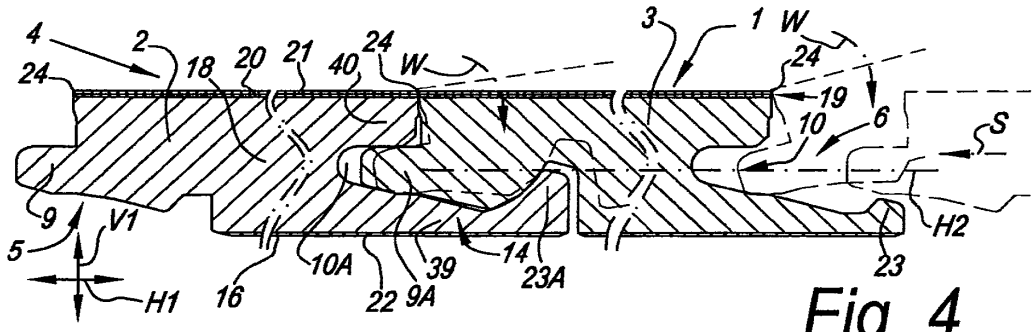


Fig. 4

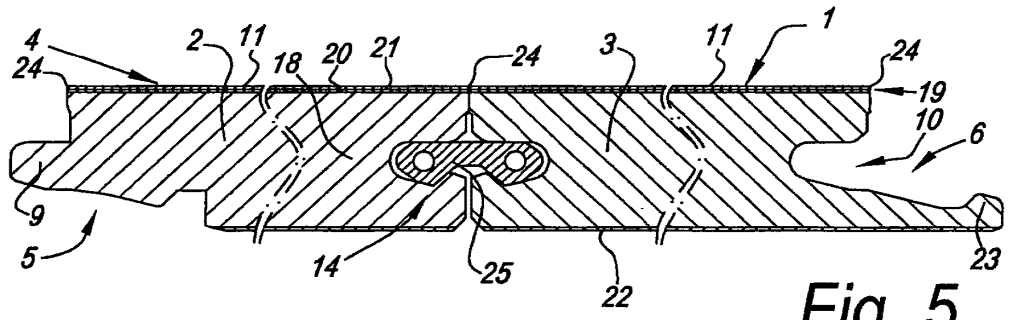


Fig. 5

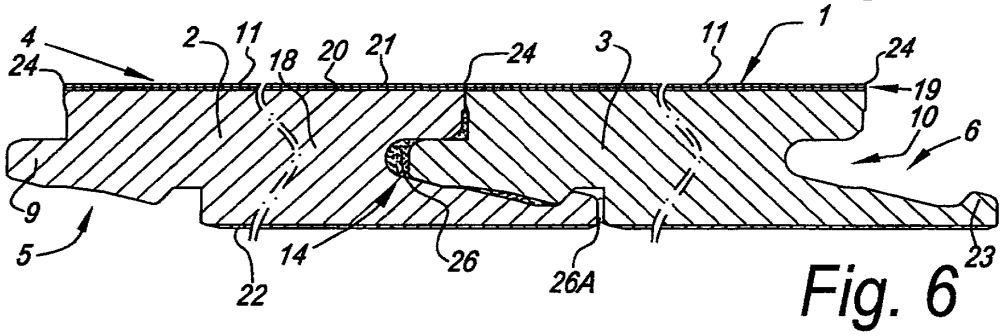


Fig. 6

I4F Exhibit 1003 - 284

I4F Exhibit 1003 - 285

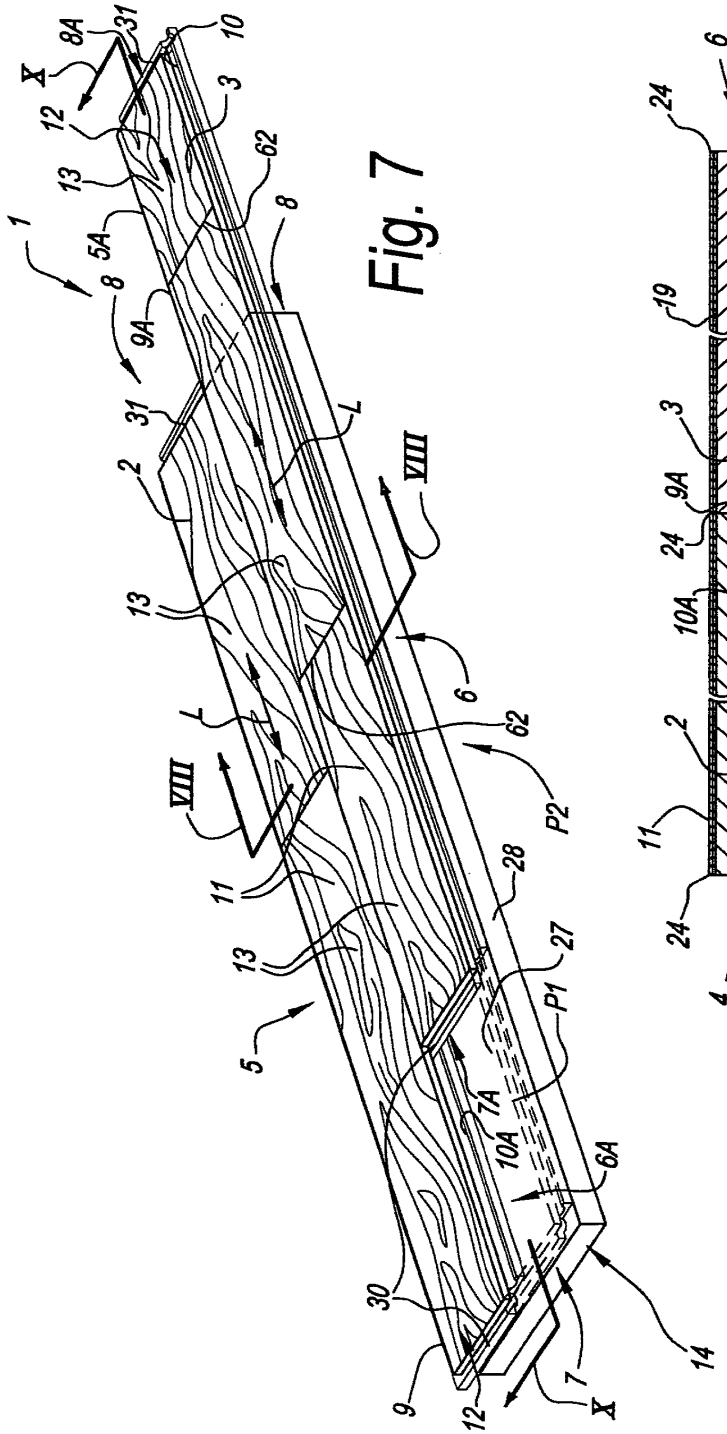


Fig. 7

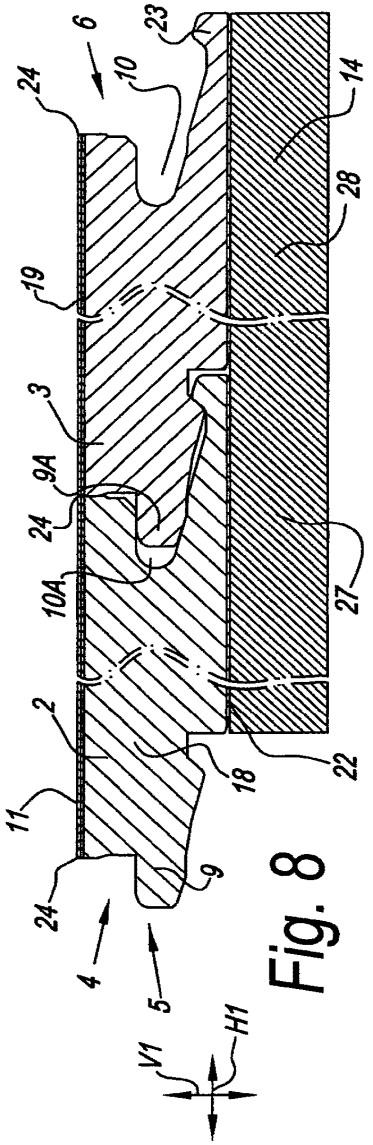


Fig. 8

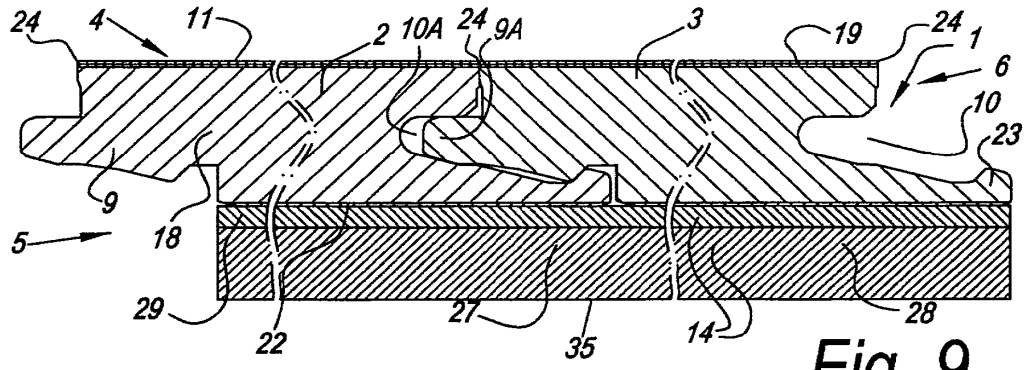


Fig. 9

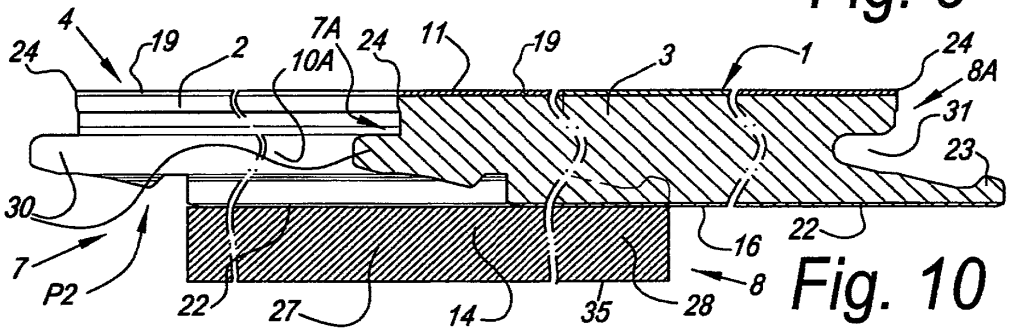


Fig. 10

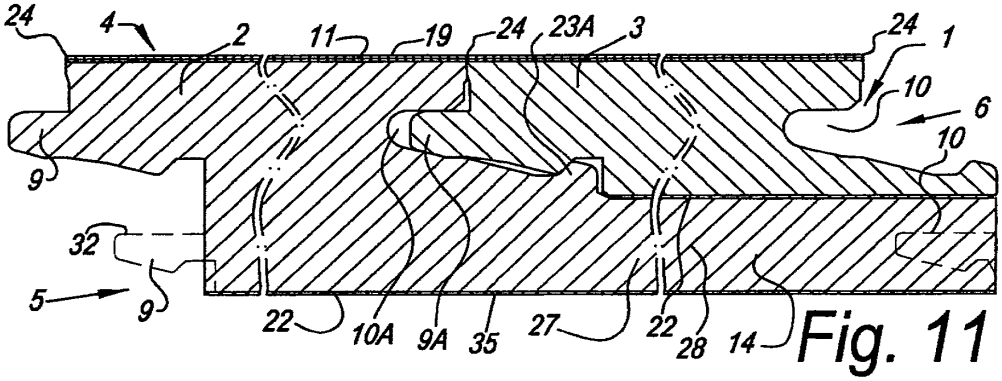


Fig. 11

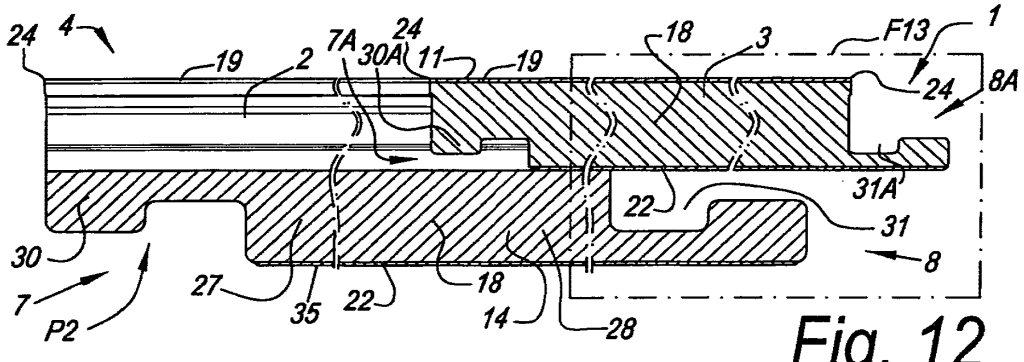


Fig. 12

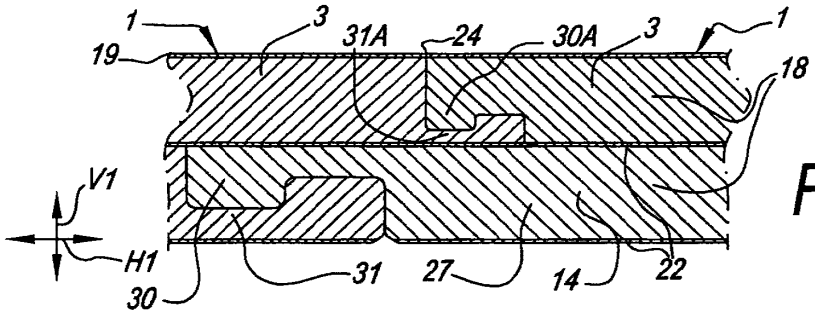


Fig. 13

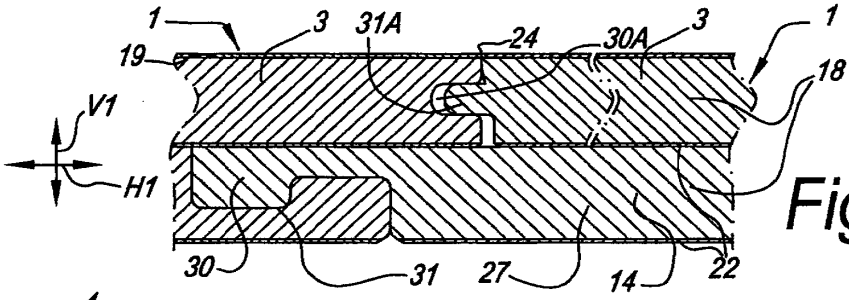


Fig. 14

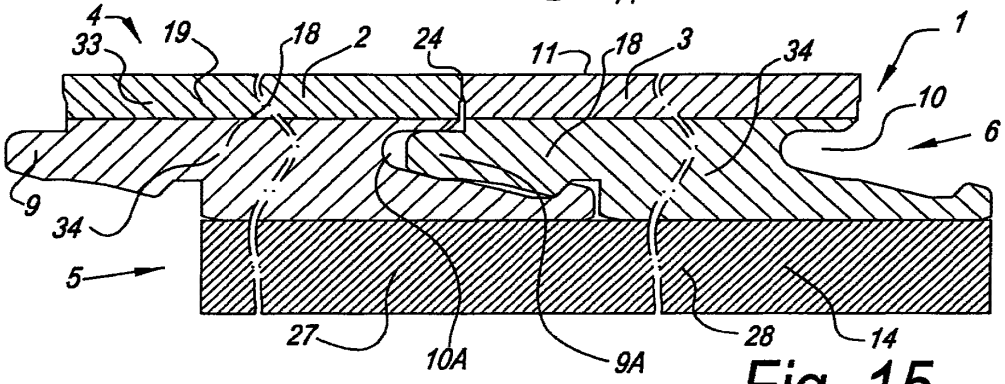


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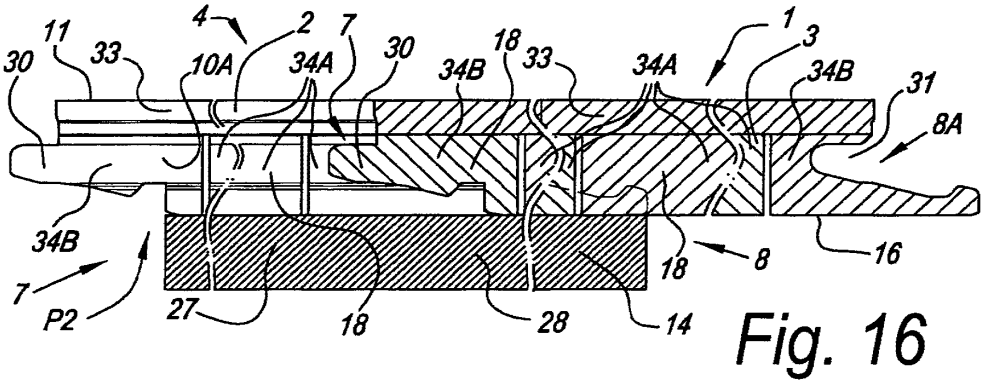


Fig. 16

I4F Exhibit 1003 - 287

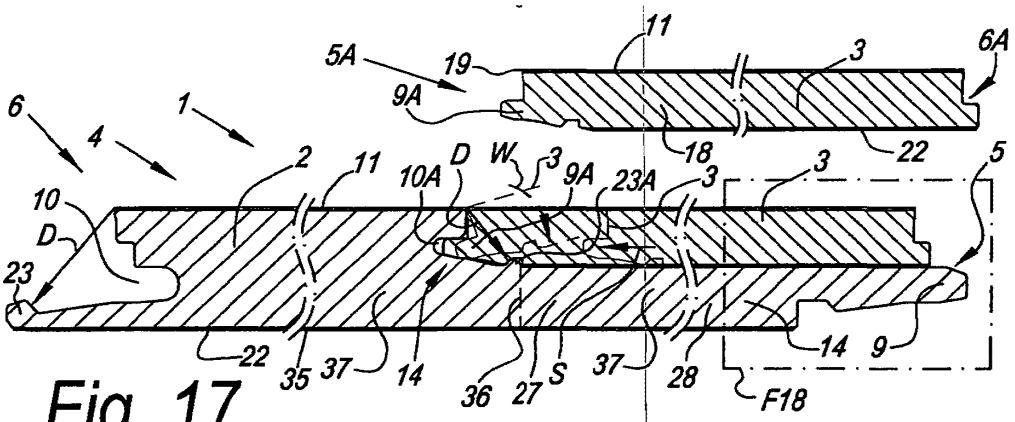


Fig. 17

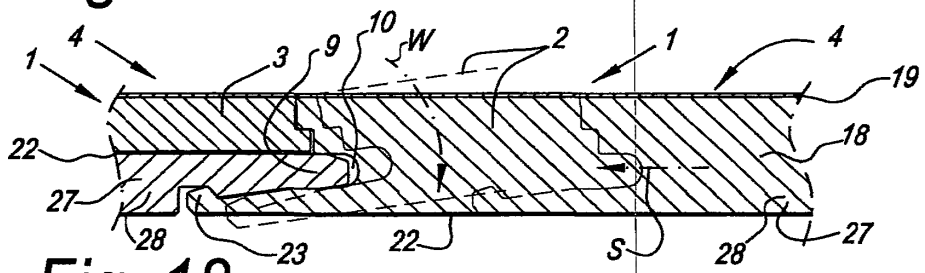


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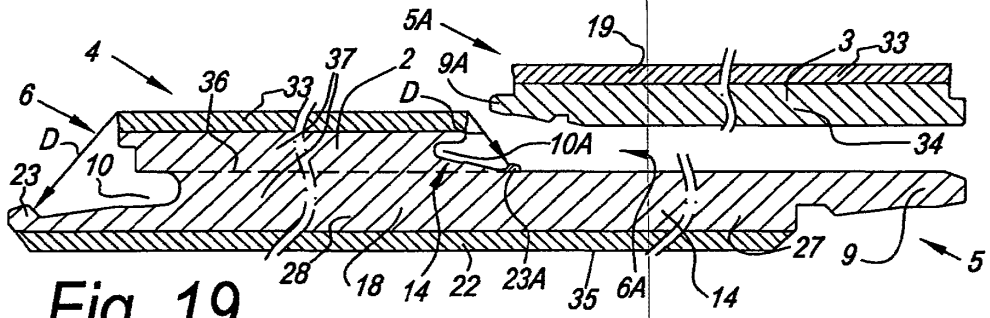


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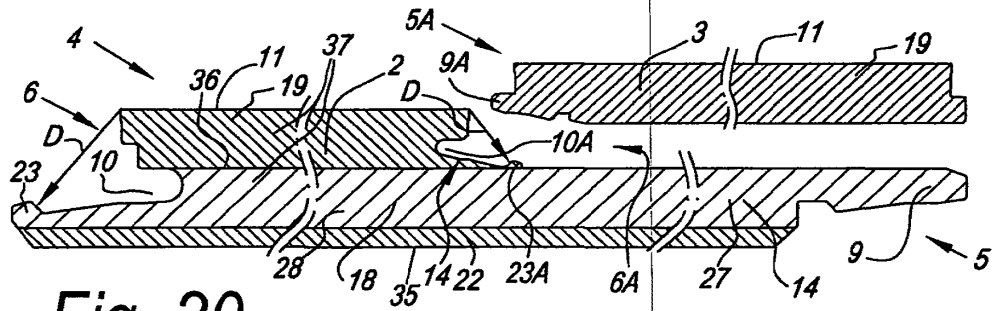


Fig. 20

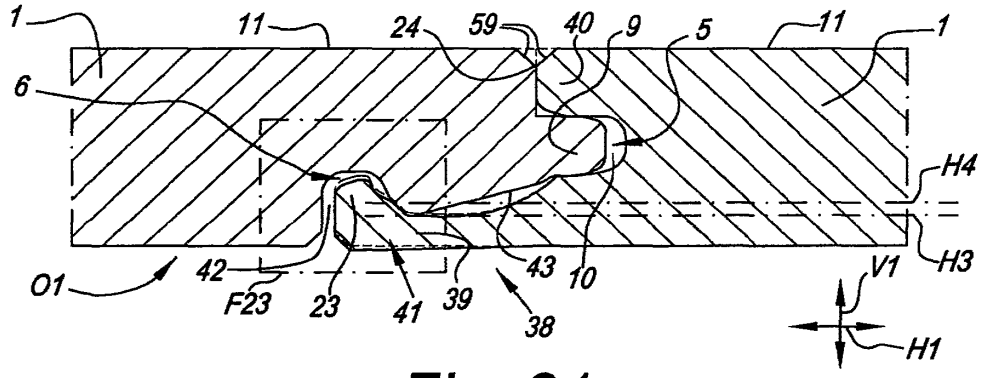


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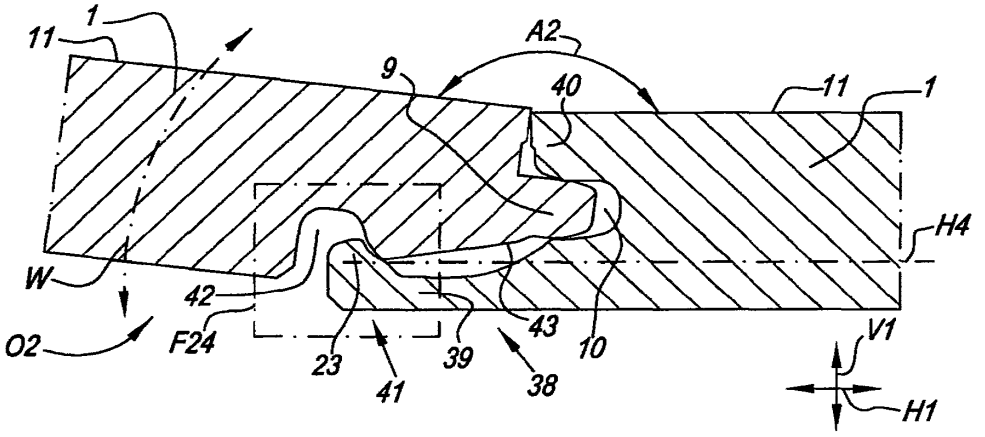


Fig. 22

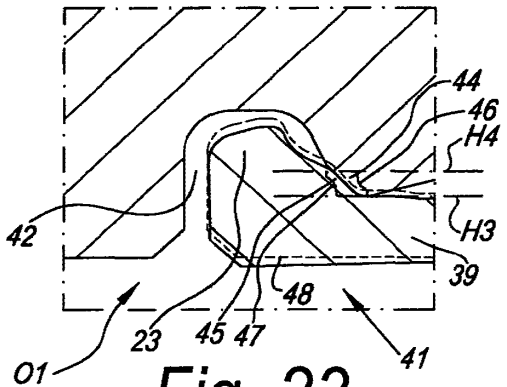


Fig. 23

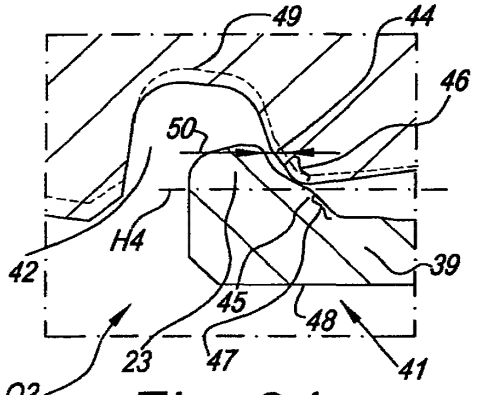


Fig. 24

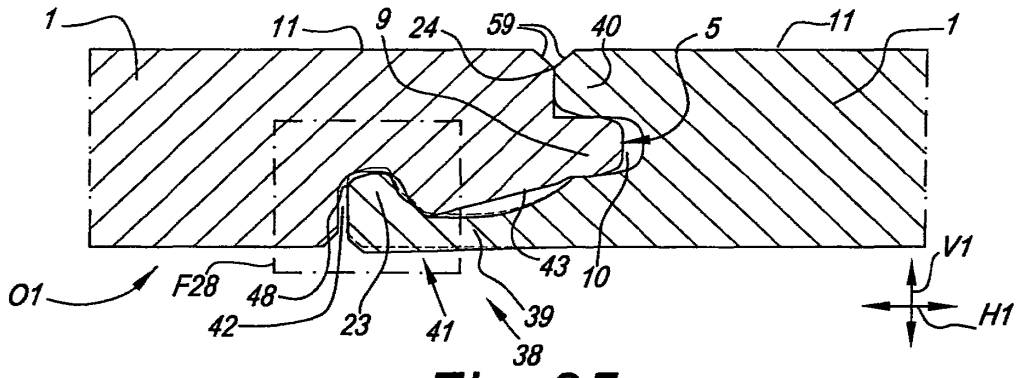


Fig. 25

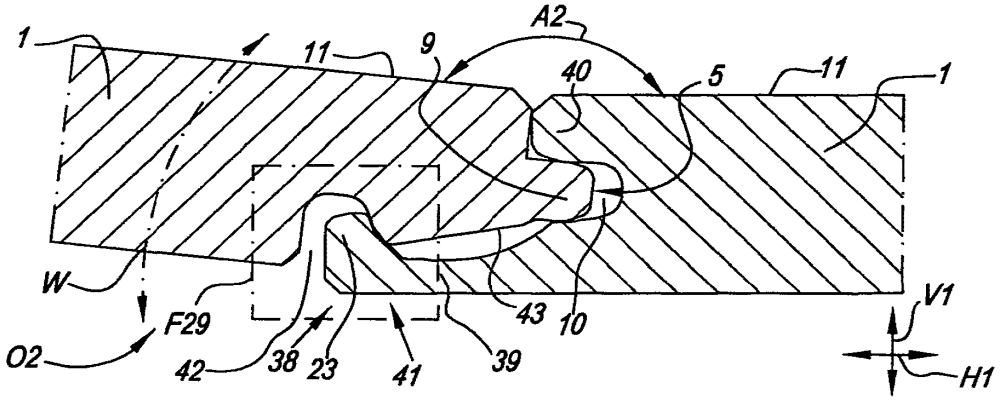


Fig. 26

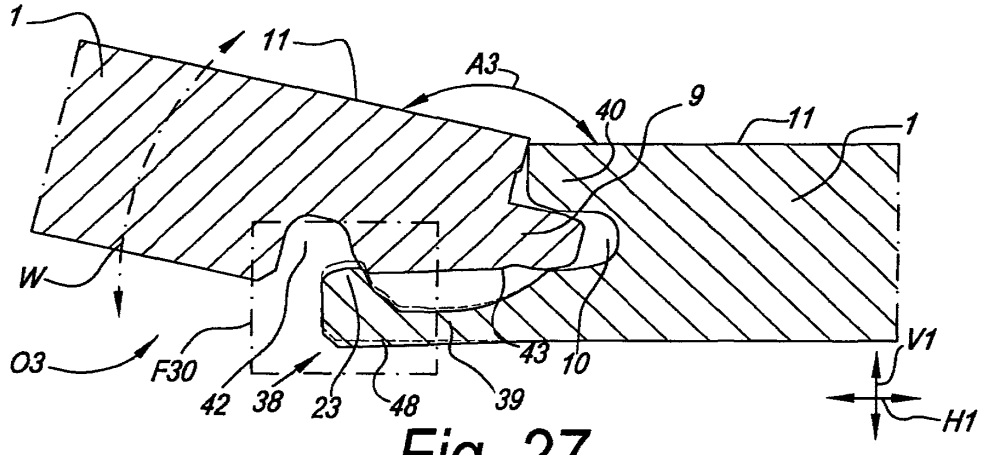


Fig. 27

I4F Exhibit 1003 - 290

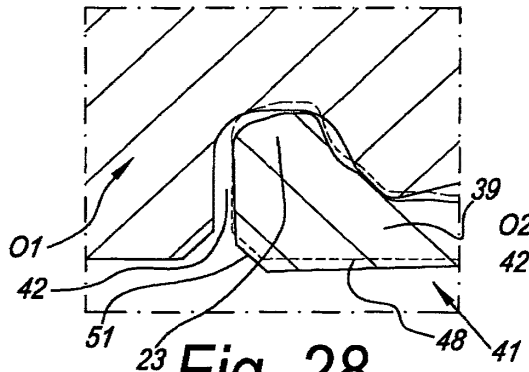


Fig. 28

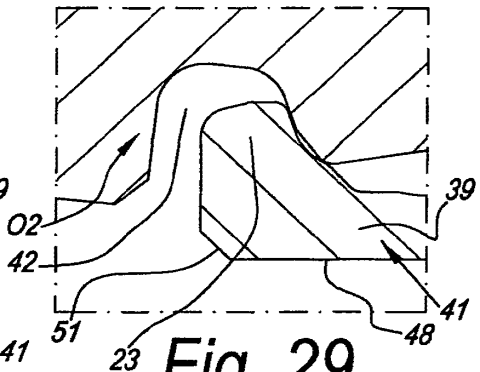


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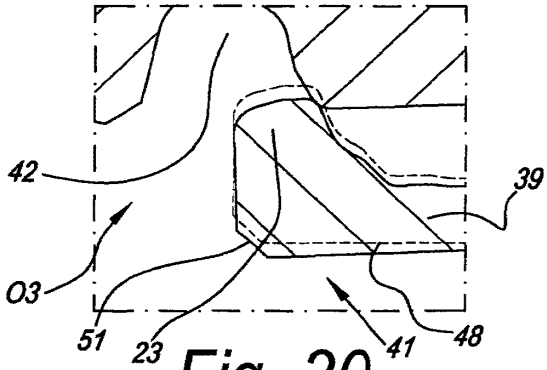


Fig. 30

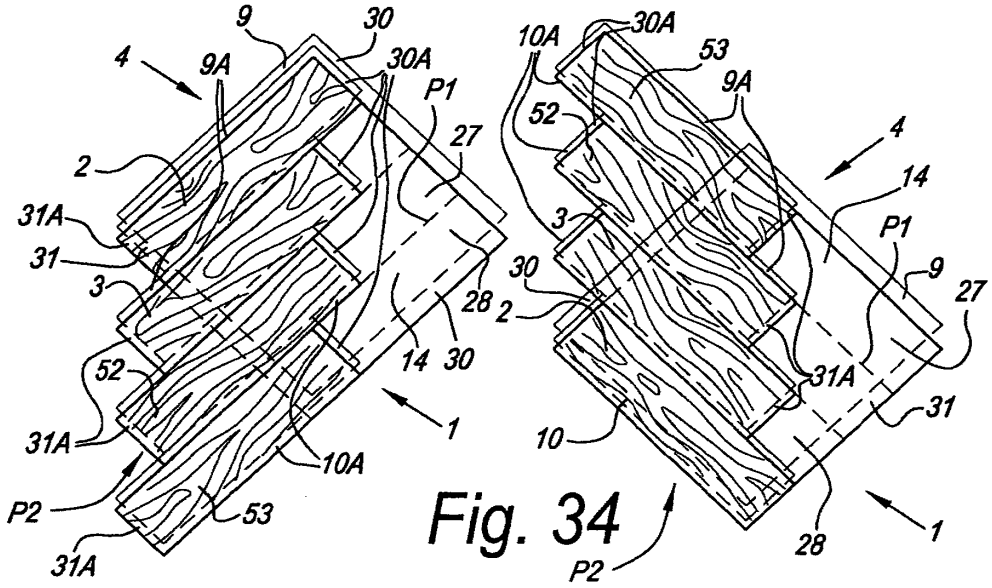


Fig. 34

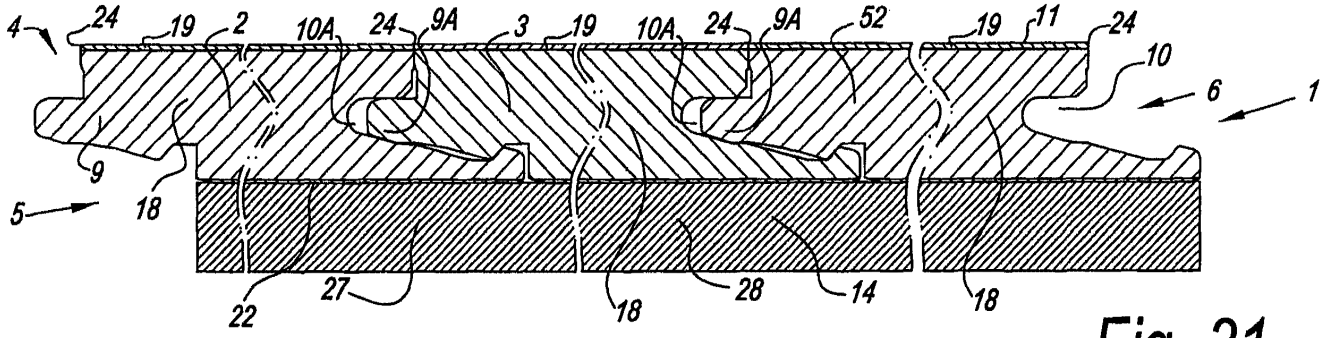


Fig. 31

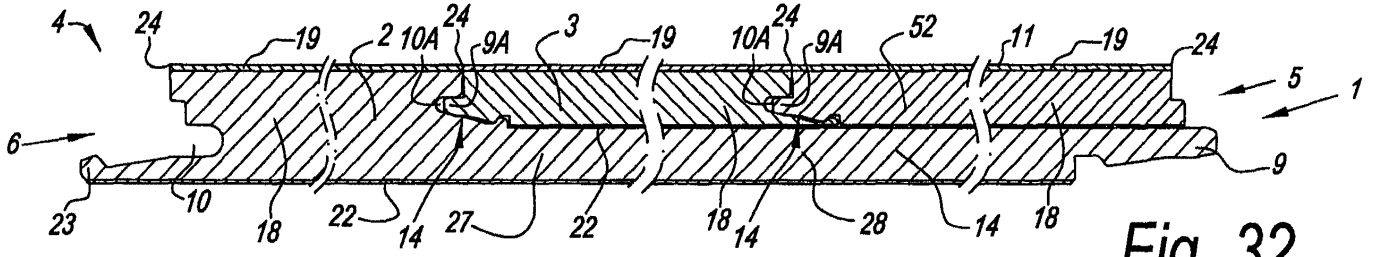


Fig. 32

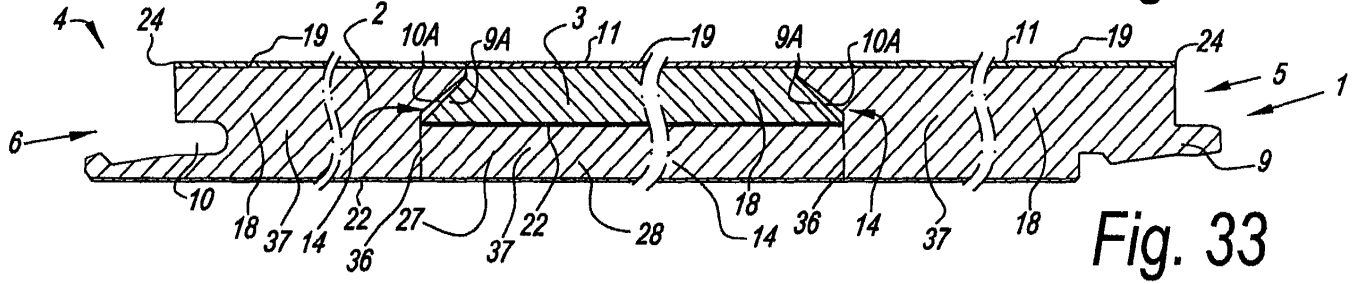


Fig. 33

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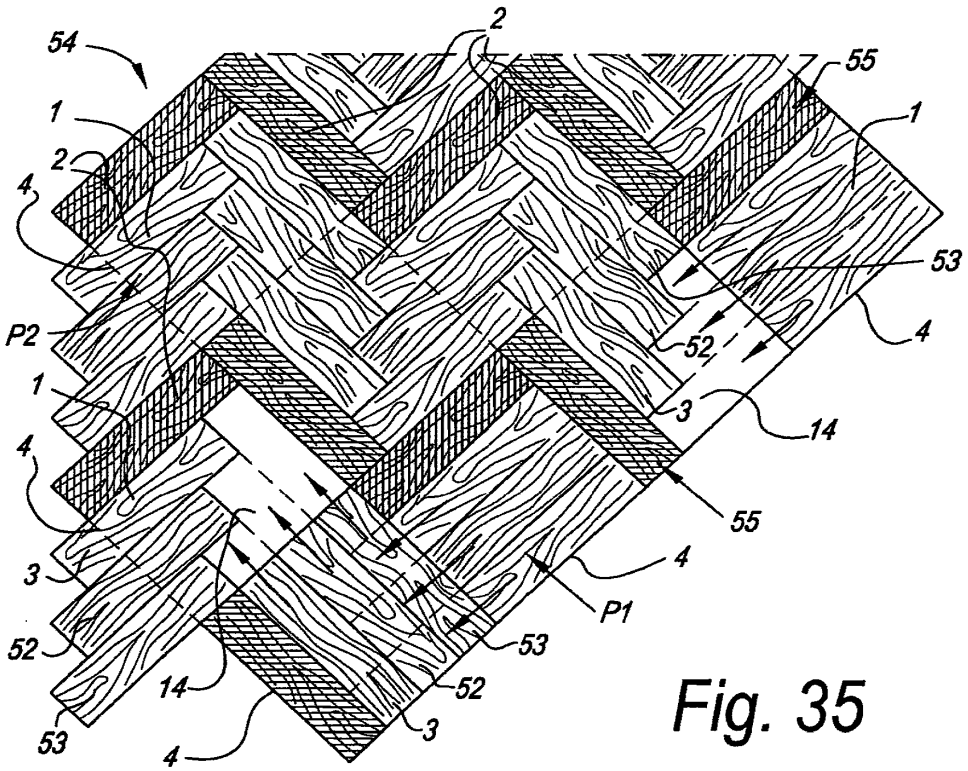

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Fig. 35

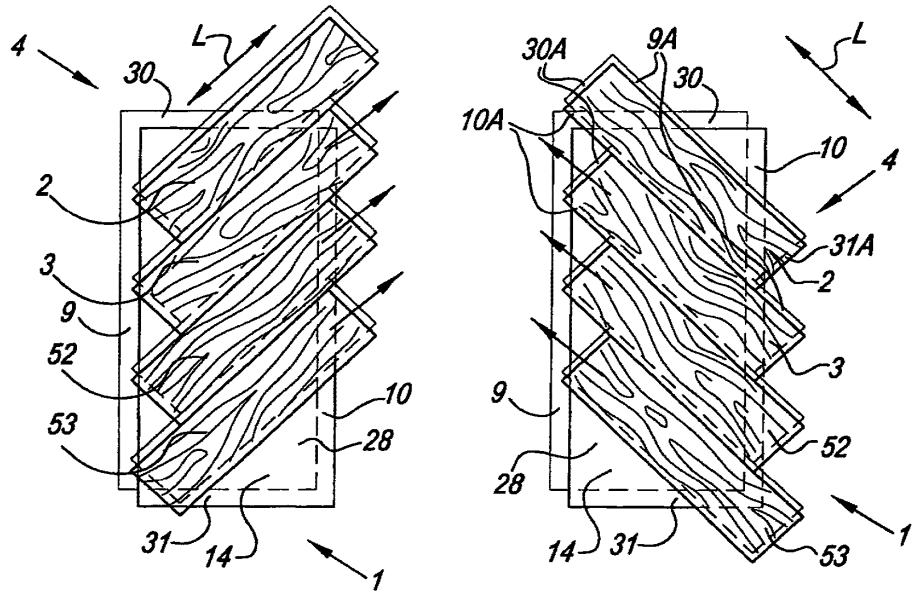

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Fig. 37

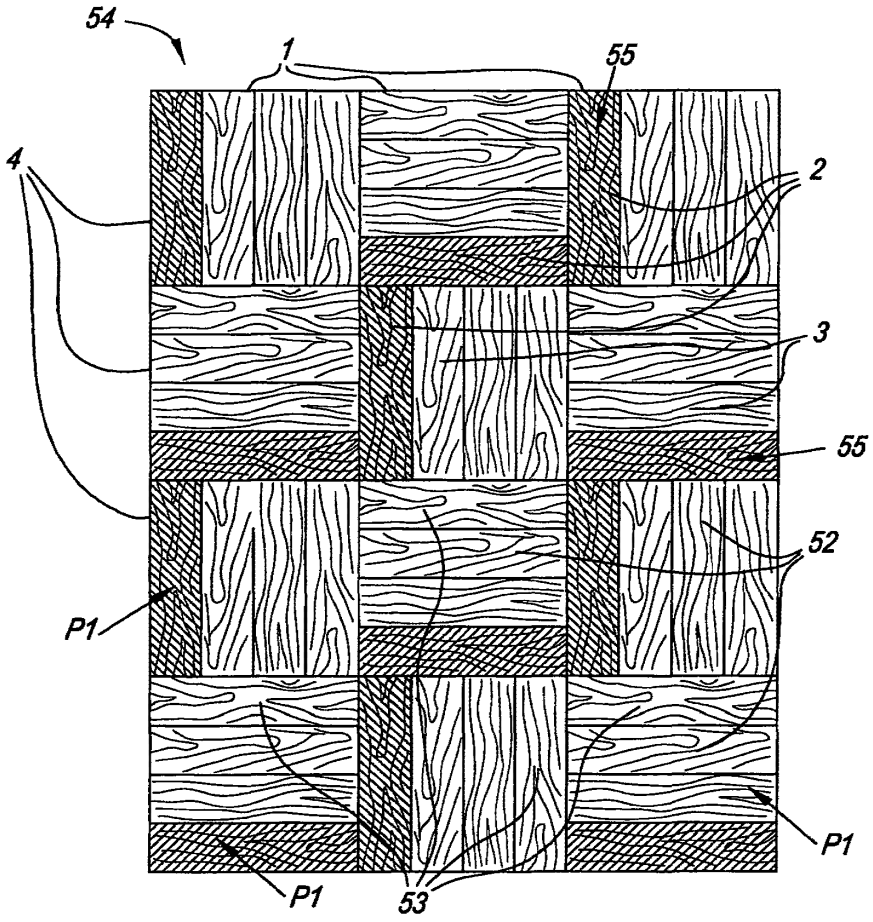
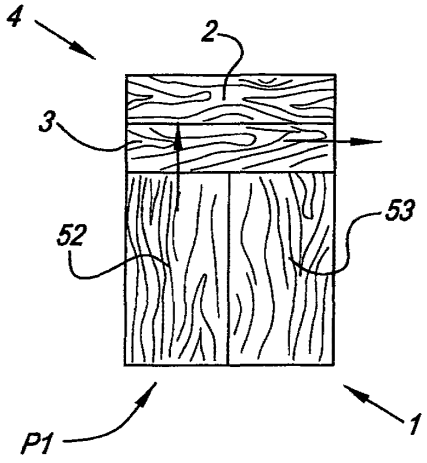


Fig. 36



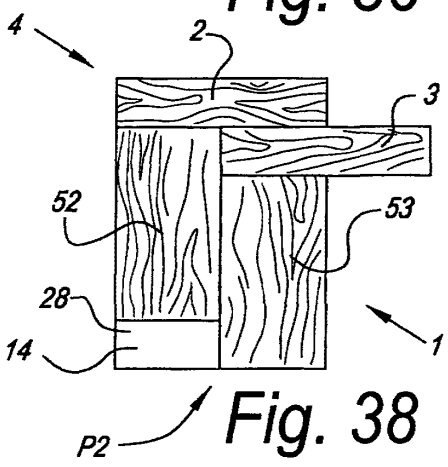


Fig. 38

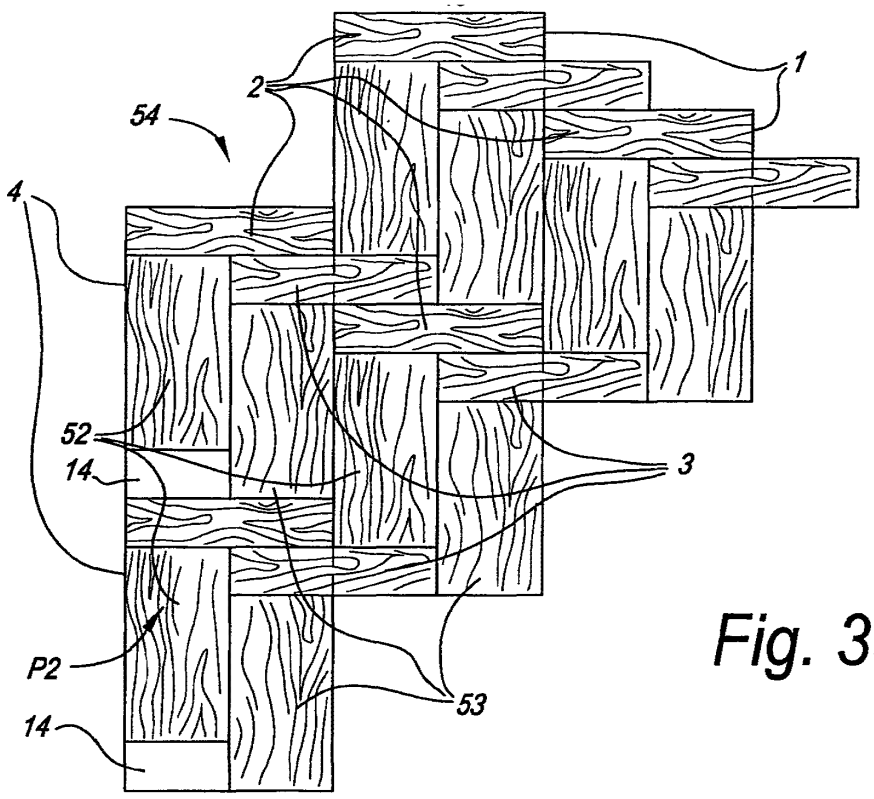


Fig. 39

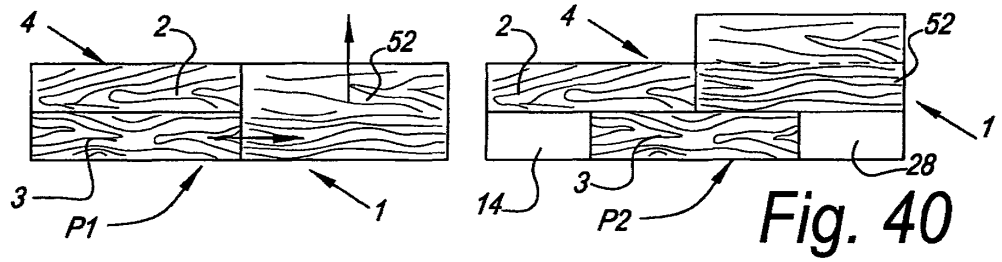


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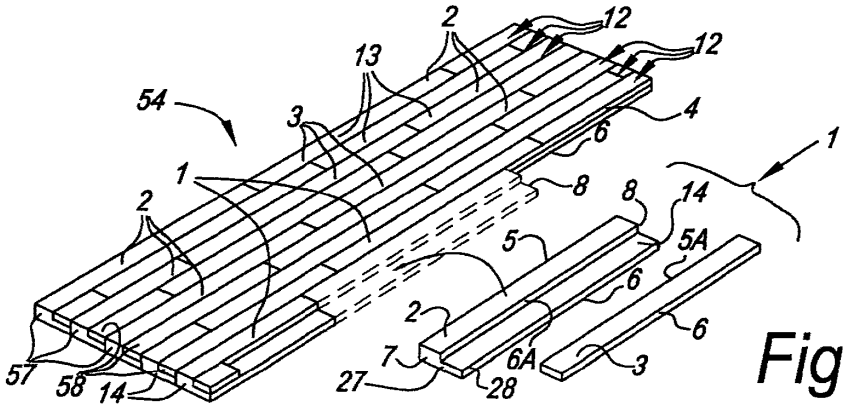


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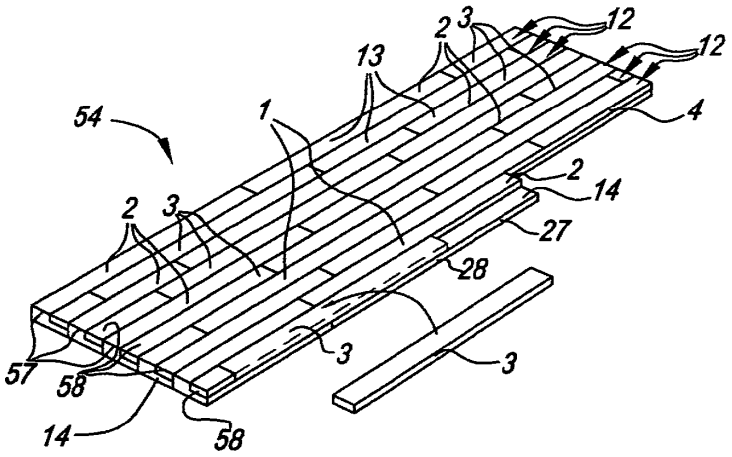


Fig. 42

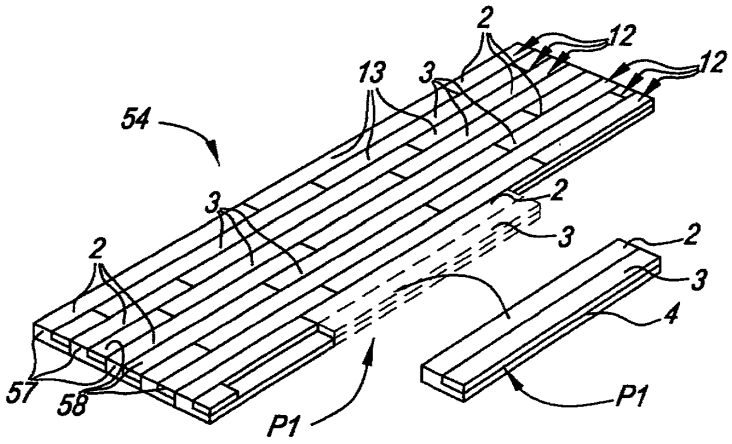


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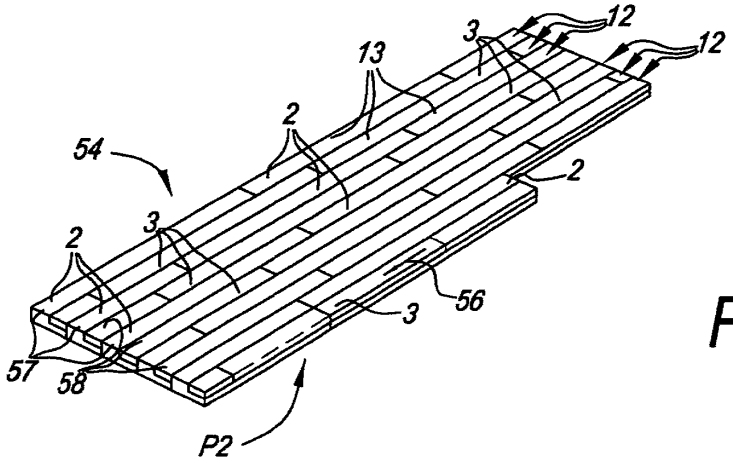


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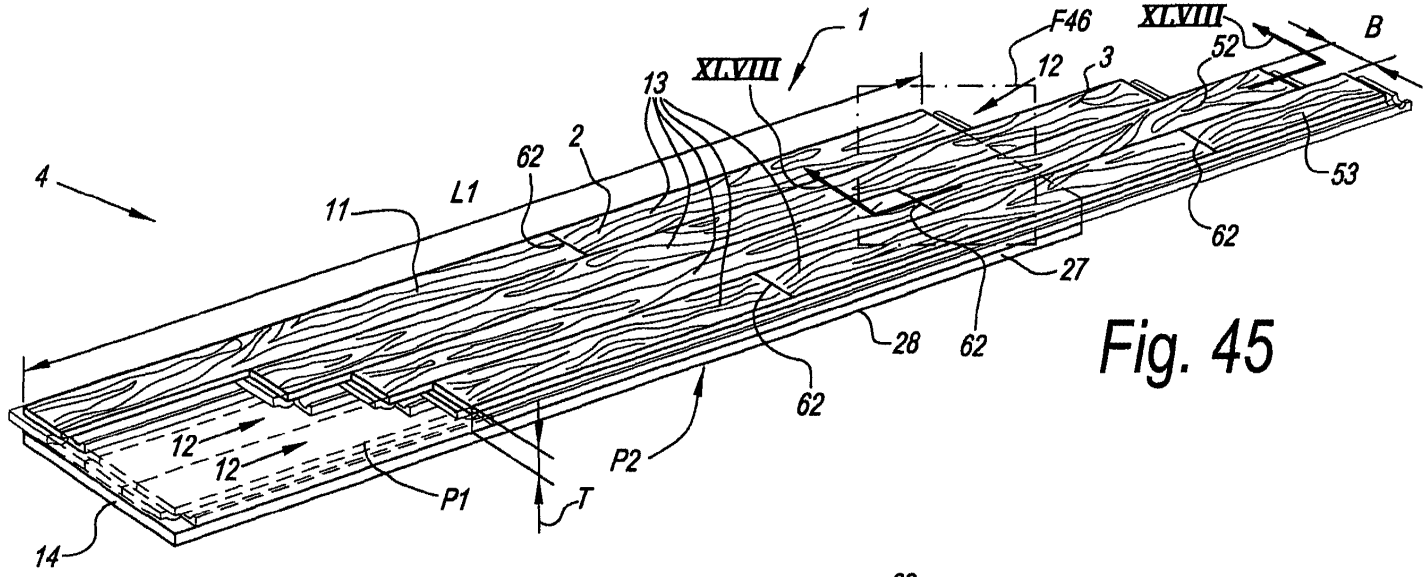


Fig. 45

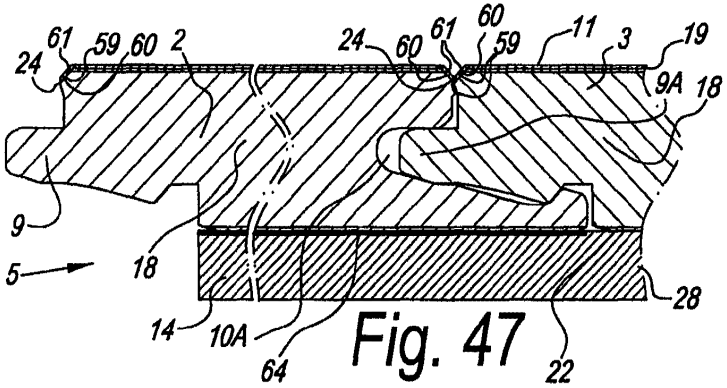


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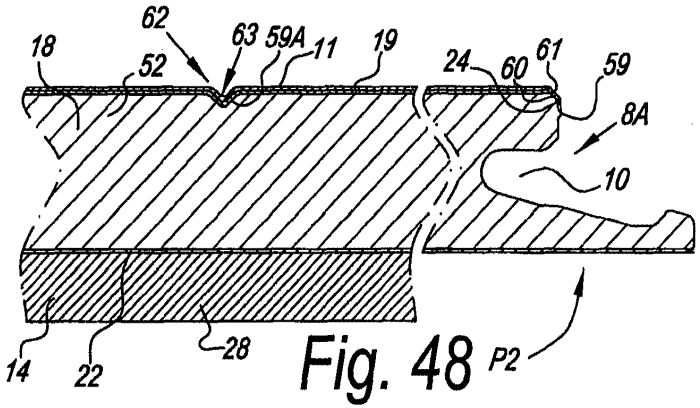


Fig. 48

DE 20 2007 013 059 U1 2007.12.20

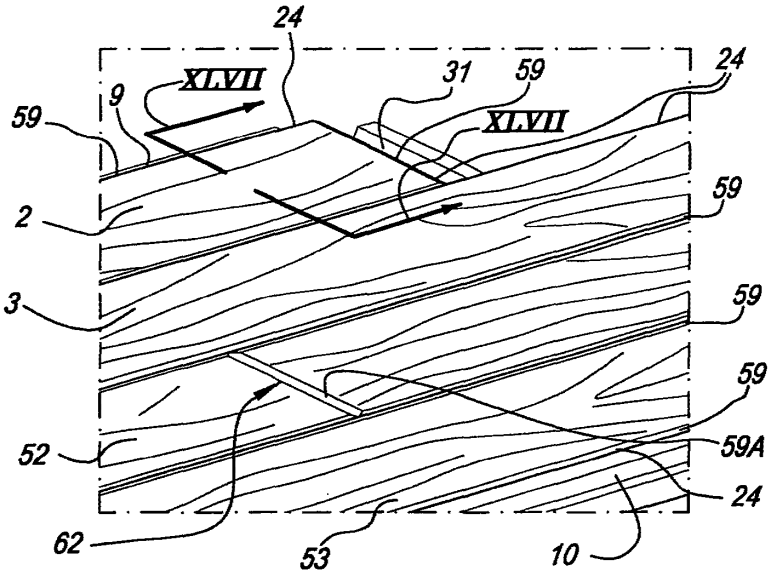


Fig. 46

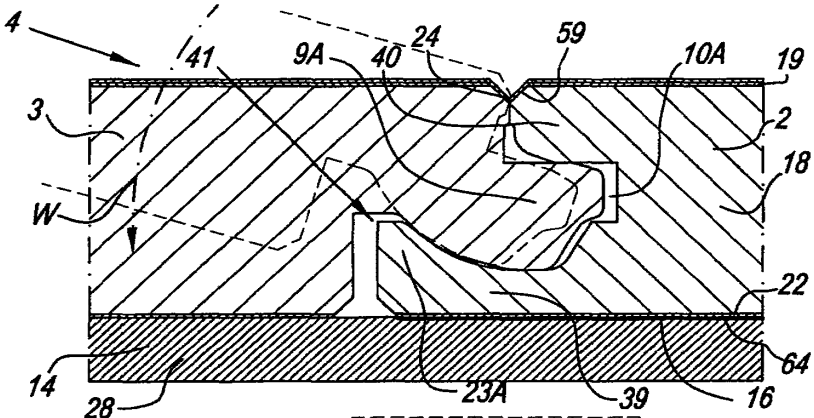


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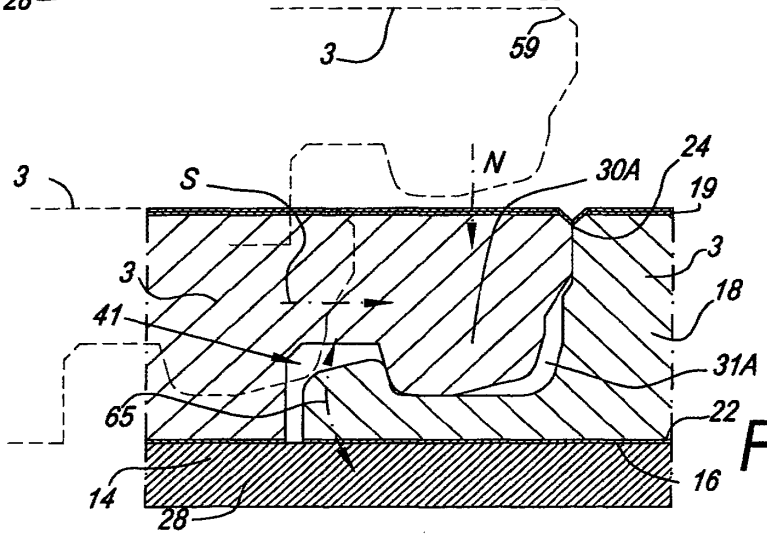


Fig. 50

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— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

— *of inventorship (Rule 4.17(iv))*

Published:

— *with international search report (Art. 21(3))*

(54) **Title**: SET OF FLOOR PANELS FOR FORMING A FLOOR COVERING

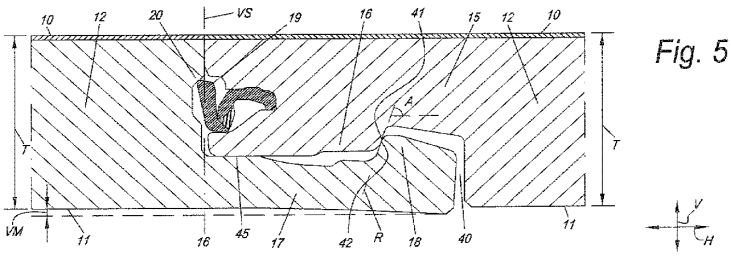


Fig. 5

(57) **Abstract**: Set of floor panels for forming a floor covering, which comprises at least two floor panels (1A-1B), which each comprise an edge (2-3) provided with a coupling part (4-5), wherein the coupling parts (4-5) are configured such that they allow realizing a coupled condition between the floor panels (1A-1B), by means of a substantially straight-lined coupling movement (M) of the one floor panel (1A) in respect to the other floor panel (1B), according to a direction substantially perpendicular to an installation plane; and wherein the coupling parts (4-5) are configured such that they, in the coupled condition, realize a tensioning force pressing the coupled edges (2- 3) towards each other.

WO 2017/068523 A1

Set of floor panels for forming a floor covering.

The present invention relates to a set of floor panels, which is suitable for forming a floor covering.

More particularly, the present invention relates to a set of floor panels for forming a floor covering, of the type which comprises at least two floor panels, which each comprise an upper side, a lower side, and a core extending between the upper and lower sides, and which each comprise an edge provided with a coupling part, wherein the coupling parts are configured such that they allow realizing a coupled condition between the floor panels by means of a substantially straight coupling movement of the one floor panel in respect to the other floor panel, according to a direction substantially perpendicular to an installation plane; wherein the coupling parts in the coupled condition effect a locking in the direction parallel to the installation plane and perpendicular to the edges, as well as a locking in the direction perpendicular to the installation plane; wherein the coupling part of the one floor panel is made as a hook-shaped part directed towards the lower side of the floor panel, herein below denominated locking hook, and the coupling part of the other floor panel is made as a hook-shaped part directed towards the upper side of the floor panel, herein below denominated receiving hook; wherein the hook-shaped parts substantially are manufactured from the material of the core of the floor panels and substantially are made in one piece therewith; wherein the locking hook comprises a lip which is provided with a locking part extending towards the lower side of the floor panel, and the receiving hook comprises a lip which is provided with a locking part extending towards the upper side of the floor panel; and wherein the locking parts, in the coupled condition, cooperate in such a manner that they effect at least the aforementioned locking in the direction parallel to the installation plane and perpendicular to the edges.

From, amongst others, documents WO 2010/015516 A2, WO 2011/028171 A1, WO 2012/084604 A1 and WO 2012/101171 A1, such sets of floor panels are known, wherein the locking in the direction perpendicular to the installation plane is effected without the assistance of a separate insertion piece or insert.

Documents WO 2006/043893 A1, WO 2008/068245 A1 and WO 2009/066153 A2 also form a disclosure of such sets of floor panels, wherein the locking in the

direction perpendicular to the installation plane is effected by means of a separate insertion piece or insert.

A general problem with the known sets of floor panels as described above is the risk of moisture or dust penetrating between the coupled edges of the floor panels.

In order to remedy this problem, the already above-mentioned WO '153 describes that the floor panels described therein can be realized with a so-called "pretension", which means that the edges in the coupled condition are pressed towards each other by means of a tensioning force.

According to WO '153, the tensioning force can be realized in that the lip of the receiving hook, in the coupled condition, is elastically bent, wherein the principle known from WO 97/47834 A1 can be applied.

In that the coupled edges are pressed towards each other, the formation of gaps in the coupled condition is counteracted and thereby the risk of moisture or dust penetrating between the coupled edges is reduced.

However, there is a risk that difficulties will be experienced when coupling the floor panels which are provided with pretension. In order to be able to realize the pretension, the profile shapes or the contours of the coupling parts in fact have to be made overlapping, and thus they are not complementary fitting. Moreover, the coupling movement can be complicated further by the almost unavoidable tolerances of the perpendicularity of the sides of the floor panels.

Therefore, the coupling parts in practice mostly are configured such that they fit into each other with a certain play, which in its turn then entrains the risk of moisture and dust penetrating between the coupled edges. However, the play provides for that the floor panels can be coupled easily and that the tolerances of the perpendicularity of the sides of the floor panels can be compensated.

WO 2007/141605 (A2) as well describes that the floor panels described therein can be realized with a pretension, by means of an elastic bending of the lip of the receiving hook in the coupled condition, which provides for that the coupling parts are pressed towards each other. However, at least one of the hooks of WO '605 for the major part is made as a separate insertion piece, which is made of a different

material than the core of the floor panel to which the respective hook is belonging. In that such insertion piece has to be provided, the floor panels of WO '605 are not cheap.

The present invention primarily aims at an alternative set of floor panels for forming a floor covering, wherein according to various preferred embodiments solutions are offered to problems with the sets of floor panels of the state of the art.

To this aim, the invention, according to a first independent aspect thereof, relates to a set of floor panels for forming a floor covering, of the aforementioned type, with the characteristic that the coupling parts are configured such that they, in the coupled condition, realize a tensioning force pressing the coupled edges towards each other, by means of an elastic bending of the lip of the receiving hook; and that the lip of the receiving hook, in the coupled condition, in the direction perpendicular to the installation plane, shows a maximum bending of at most 0.0625 times the overall thickness of the floor panel.

The inventor has found that a maximum bending of at most 0.0625 times the overall thickness of the floor panel allows effectively counteracting the forming of gaps between the coupled edges and in this manner minimizing or even excluding the risk of penetrating moisture and dust. Therein, moreover it has become apparent that the floor panels, although they are provided with a pretension, still can be coupled to each other in a smooth manner.

A particularly good balance between the extent of gap counteracting and the smoothness of installation can be obtained when said maximum bending is at most 0.05 times the overall thickness of the floor panel and preferably is situated between 0.0065 and 0.025 times the overall thickness of the floor panel, wherein a value of approximately 0.0125 times the overall thickness of the floor panel has proven ideal.

Herein, it is noted that the maximum bending of the respective lip has to be understood as the maximum bending in respect to the resting condition of the lip, i.e. in respect to the condition of the lip in not-coupled or not-installed condition of the floor panels.

The maximum bending can be obtained in a simple manner in the case that the elastic bending relates to a downward bending, wherein the term "downward" has to be interpreted relative in respect to the installation plane of the floor panels.

For example, this may relate to a downward bending, wherein the lip of the receiving hook partially is situated lower than a level defined by the lower side of the floor panel to which the locking hook is belonging.

The elastic bending preferably relates to a bending continuously increasing in distal direction in respect to the receiving hook, wherein said maximum bending occurs at the distal end of the lip of the receiving hook. As the mentioned maximum bending is achieved by means of a continuously increasing bending, the advantage is obtained that a particularly effective tensioning force can be realized without thereby creating an appreciable risk of breaking or damage. In fact, the load to which the respective lip is subjected can be distributed over the length of the respective lip.

The herein above-mentioned advantages primarily will be apparent in the case that the lip of the receiving hook is bent at least over 25%, and preferably at least over 50% of its length, and still more when the respective lip is bent over at least 75% of its length.

It is also noted that the term "thickness" indicates the dimension according to the direction perpendicular to the upper or lower side of the floor panel. In particular, by the overall thickness of the floor panel the distance is indicated between the upper and lower sides of the floor panel.

It is also noted that the term "length" has to be understood as the dimension according to the direction parallel to the upper or lower side and perpendicular to the edges.

According to a second independent aspect thereof, the present invention relates to a set of floor panels for forming a floor covering, of the aforementioned type, with the characteristic that the coupling parts are configured such that they, in the coupled condition, realize a tensioning force pressing the coupled edges towards each other, by means of an elastic bending of the lip of the receiving hook; and that the coupling parts are configured such that at least a portion of the locking part extending towards the lower side of the floor panel fits into an opening defined

between the portion extending towards the upper side of the floor panel and a proximal side of the receiving hook, without having to elastically bend the lip of the receiving hook to this aim. Herein, by the term "opening" a recess or groove is meant which is provided in the lip of the receiving hook, and in which the locking part of the locking hook directed towards the lower side of the floor panel becomes seated in the coupled condition of the floor panels.

This configuration of the coupling parts offers the advantage that the smoothness of installation of the floor panels can be guaranteed although they are provided with a pretension.

Moreover, the elastic bending of the lip of the receiving hook can be initiated starting from an already partially engaged condition of the hook-shaped parts. Consequently, the risk of a difficult engagement of the hook-shaped parts, for example, as a result of the elastic deformation of the respective lip, can be minimized or even excluded.

For example, the elastic bending is initiated by a mutual interaction of proximal sides, more particularly locking surfaces, of the locking parts.

According to an independent third aspect thereof, the present invention relates to a set of floor panels for forming a floor covering, of the aforementioned type, with the characteristic that the coupling parts are configured such that they, in the coupled condition, realize a tensioning force pressing the coupled edges towards each other, by means of an elastic bending of the lip of the receiving hook; and that the lip of the receiving hook has a minimum thickness which is at least 1/5 times and at most 1/3 of the overall thickness of the floor panel; and that the length of the lip of the receiving hook, measured between the vertical closing surface and the distal end of the lip, is at least 1 times and at most 3/2 times the overall thickness of the floor panel. Herein, the term "vertical closing surface" has to be understood as the vertical surface defined there, where the upper edges of the floor panels adjoin each other. In other words, this is the vertical surface which is defined there, where a distal side of the locking hook adjoins against a proximal side of the receiving hook.

The realization of the respective lip offers the advantage that, on the one hand, it can be provided with elastic features in order to undergo the elastic bending, and, on the other hand, can be provided with the required strength and stability, such that

the forming of gaps can be counteracted in an effective manner and the risk of breaking or damage can be minimized.

A particularly good balance between elasticity and stability can be obtained when said minimum thickness is at most 0.3 times the overall thickness of the floor panel, wherein it has proven ideal when said minimum thickness is at most 1/4 times the overall thickness of the floor panel.

With the same aim, the herein above-defined length preferably is at most 1.4 times the overall thickness of the floor panel, wherein said length most preferably is at most 4/3 times the overall thickness of the floor panel.

It is also noted that the term "length" has to be understood as the dimension according to the direction parallel to the upper or lower side and perpendicular to the edges.

According to an independent fourth aspect thereof, the present invention relates to a set of floor panels for forming a floor covering, of the aforementioned type, with the characteristic that the coupling parts are configured such that they, in the coupled condition, realize a tensioning force pressing the coupled edges towards each other, by means of an elastic bending of the lip of the receiving hook; and that the lip of the receiving hook comprises a bridge part connected to the core of the floor panel, and an end part connected to the bridge part, to which the locking part extending towards the upper side of the floor panel is belonging, wherein the bridge part comprises an upper side provided with a recess or groove, which recess, viewed according to the direction parallel to the upper or lower side of the floor panel and perpendicular to the edge, is situated at a distance from there, where the bridge part is connected to the core of the floor panel, and from there, where the bridge part is connected to the end part.

The recess offers the advantage that the lip of the receiving hook can be provided with elastic features in order to allow the elastic bending, however, can be made relatively rigid or stable, such that, via the mentioned tensioning force, it can effectively counteract the formation of gaps, without thereby being subjected to breaking or damage.

The mentioned advantages are particularly apparent in the case that the lip of the receiving hook has its minimum thickness there, where said recess is provided.

There, where the bridge part is connected to the core of the floor panel, and there, where it is connected to the end part, the bridge part preferably is made more rigid or thicker than there, where said recess is provided. In this manner, the risk of breaking or damage can be minimized, in particular there, where the load on the respective lip can be highest.

It can be prevented that the elastically bent lip will break under normal usage conditions, when the bridge part there, where it is connected to the core of the floor panel, has a thickness which is at least 1/5 times, and preferably at least 1/4 times the overall thickness of the floor panel.

Moreover, the bent lip can be enabled to compensate external forces, to which the locking part of the receiving hook can be subjected under normal usage conditions, without damage, in the case that the bridge part there, where it is connected to the end part, has a thickness which is at least 1/5 times, and preferably at least 1/4 times the overall thickness of the floor panel.

According to an independent fifth aspect thereof, the present invention relates to a set of floor panels for forming a floor covering, of the aforementioned type, with the characteristic that the coupling parts are configured such that they, in the coupled condition, realize a tensioning force pressing the coupled edges towards each other; and that the coupling parts are configured such that they allow to uncouple the floor panels, starting from the coupled condition, by means of a rotational movement of the one floor panel around the other floor panel, around an axis parallel to the installation plane and the edges, wherein the upper sides of the floor panels during said rotational movement are moved towards each other.

The advantage is obtained that the floor panels, from the coupled condition, in which the edges are pressed towards each other, can be uncoupled in a simple manner. Thus, the user is offered the opportunity of a simple de-installation of the floor panels coupled with tensioning force.

The tensioning force preferably is realized by means of an elastic bending of the lip of the receiving hook.

The lip of the receiving hook preferably comprises a bridge part connected to the core of the floor panel, and an end part connected to the bridge part, to which end part the locking part extending towards the upper side of the floor panel is belonging. There, where the bridge part is connected to the end part, it preferably has a thickness which is at least 1/5 times and preferably at least 1/4 times the overall thickness of the floor panel. That the bridge part there, where it is connected to the end part, is made relatively thick, offers the advantage that the proximal side, more particularly the locking surface, of the locking part extending towards the upper side of the floor panel, can be lifted, which facilitates the pivoting apart of the floor panels.

According to a sixth independent aspect thereof, the present invention relates to a floor panel for forming a floor covering, of the aforementioned type, with the characteristic that the coupling parts are configured such that they, in the coupled condition, realize a tensioning force pressing the coupled edges towards each other, by means of an elastic bending of the lip of the receiving hook; that each of the floor panels comprises an edge adjacent to its aforementioned edge, herein below denominated adjacent edge, which is provided with a coupling part, wherein the coupling parts at the adjacent edges are configured such that they allow realizing a coupled condition between the floor panels, wherein the coupling parts at the adjacent edges, in coupled condition, effect a locking in the direction parallel to the installation plane and perpendicular to the adjacent edges, as well as a locking in the direction perpendicular to the installation plane, and wherein the coupling parts at the adjacent edges are configured such that they, in coupled condition, realize a tensioning force which, by means of an elastic bending of a lip pertaining to the coupling parts of the adjacent edges, presses the adjoining coupled edges towards each other; and that, in the coupled condition of a plurality of the floor panels, the average degree of bending of the lip of the receiving hook, viewed over the length of the coupled edges, differs from the average degree of bending of the lip pertaining to the coupling parts of the adjacent edges, viewed over the length of the coupled adjacent edges. Herein, it is noted that the “length of the edges” here has to be understood as the dimension of these edges in the direction parallel to the edges and the installation plane.

As the average bending of the respective lips is different, the advantage is obtained that an additional degree of freedom is created for optimizing the features of the floor covering, for example, in the field of water or dust resistance.

The inventor has found that it is particularly advantageous, in respect to the smoothness of installation, that the average degree of bending of the lip of the receiving hook is larger than the average degree of bending of the lip pertaining to the coupling parts of the adjacent edges. Specific advantages thereof will be explained in more detail in the detailed description.

The coupling parts at the adjacent edges preferably are configured such that they allow realizing the coupled condition between the floor panels by means of a rotational movement of the one floor panel in respect to the other floor panel, around an axis parallel to the installation plane and the adjacent edges, in such a manner that a plurality of the floor panels can be coupled by means of a fold-down movement.

For example, the coupling parts at the adjacent edges can be realized as a tongue and a groove, wherein the groove is bordered by an upper lip and said lip pertaining to the coupling parts of the adjacent edges, herein below denominated lower lip, which lower lip preferably extends beyond the distal end of the upper lip. The tongue and the groove may be provided with lock-up parts, which in coupled condition effect said locking in the direction parallel to the installation plane and perpendicular to the adjacent edges.

It is also noted that the characteristics of the herein above-described six aspects within the scope of the invention can be combined at choice, as far as they are not contradictory.

Herein below, preferred, as well as alternative and possible embodiments of the present invention are described, which, as such or in combination, can be applied to the herein above-described six aspects, as far as they are not contradictory.

It is also noted that, if not stated otherwise, herein below by the terms “edges” and “coupling parts”, respectively the edges are meant which are provided with the coupling parts which are made in the form of the herein above-described hook-shaped parts, and the coupling parts are meant which are made in the form of the herein above-described hook-shaped parts.

The ease of installation of the floor panels provided with pretension is promoted, in the case that the locking part extending towards the upper side of the floor panel defines a point situated most towards the upper side of the floor panel, which point is situated in the lower half of the floor panel. Moreover, such embodiment of the respective locking part facilitates the possibility of pivoting the floor panels out of each other in order to uncouple them.

It is beneficial for the strength and solidity of the lip of the receiving hook when it comprises a bottom side which is free from recesses or grooves.

The locking in the direction perpendicular to the installation plane, at the edges to which the hook-shaped parts are pertaining, preferably is effected by means of locking elements, of which more particularly at least one locking element is realized as a separate insertion piece or insert. The advantage of such insertion piece is that the features thereof can be adapted, on the one hand, in order to couple the floor panels in a smooth manner, irrespective of the overlapping embodiment of the coupling parts, and, on the other hand, to be able to provide for a strong vertical locking, separate from the material of which the actual floor panel is manufactured.

Preferably, the insert is provided in a groove present in a distal side of the locking hook. Such groove can be provided without any noteworthy weakening of the locking hook and, more important, without a disadvantageous influence on the stability or solidity of the lip of the receiving hook and the tensioning force supplied by the lip.

However, the invention does not exclude that the insert is placed in a groove provided in a proximal side of the receiving hook. However, such groove can have a detrimental influence on the stability of the lip of the receiving hook and consequently on the tensioning force supplied by the lip.

Preferably, the insert comprises an elastically bendable portion, which, during the coupling movement, performs a lateral movement and is brought from a relaxed or initial condition towards a locking condition, in which the movable portion cooperates with the locking element at the other floor panel. The advantage of such elastically bendable portion is that the elasticity thereof can be applied for promoting the coupling of the floor panels, irrespective the overlapping embodiment of the contours of the coupling parts.

For example, the insert may comprise a pivotable blocking body, as known as such from documents WO 2008/068245 A1 and WO 2013/102804 A2, or consist of a displaceable tongue which is provided in a displacement groove, as known as such from WO 2006/043893 A1.

In the locking condition, the aforementioned movable part can at least be partially tensioned, by which the movable part realizes a tensioning force. That the movable part is tensioned in the coupled condition, offers the advantage that the contact of that part with the locking element on the other floor panel can be guaranteed. In this manner, a good locking in the direction perpendicular to the installation plane is obtained, and the risk of the occurrence of height differences between the upper sides of the floor panels can be minimized.

The tensioning force supplied by the movable part and the tensioning force supplied by the lip of the receiving hook preferably are configured such that the coupled edges are pressed towards each other. For example, the tensioning force supplied by the movable part comprises at least a force component, which presses the coupled edges out of each other, wherein this force component is smaller than the force component of the tensioning force supplied by the lip of the receiving hook, which presses the coupled edges towards each other. In other words, the resultant of the tensioning forces provides for that the coupled edges still are pressed towards each other.

Herein, it is also noted that it has proven particularly advantageous to realize the insert as a coextruded strip, as known as such from WO 2009/066153 A2. In fact, by means of coextrusion the insert can be realized such that it effects a strong vertical locking and also allows a smooth installation, irrespective of the overlapping design of the coupling parts.

However, it is noted that the present invention does not exclude that the vertical locking is effected without the assistance of an insertion piece or insert, and that the herein above-mentioned locking elements all are manufactured from the material of the core of the floor panels and are made in one piece therewith.

On one distal side thereof, the locking part extending towards the upper side of the floor panel preferably is free from locking elements. In particular, in the coupled condition of the floor panels a room or space is formed between said distal side and

the opposite edge. Hereby, the advantage is obtained that the respective lip can be bent out easily, as by means of said space room is made for that.

Each of the aforementioned locking parts preferably is provided with a locking surface on a proximal side of the locking part, wherein the locking surfaces in coupled condition cooperate such that they effect at least the locking in the direction parallel to the installation plane and perpendicular to the edges. These locking surfaces preferably are made of the material of the core of the floor panels and are made in one piece therewith.

Although it is not excluded that the locking surfaces assist in the locking in the direction perpendicular to the installation plane, they preferably will not do this. The fact that they do not assist in the mentioned locking, contributes to a smooth installation of the floor panels which have to be coupled with a tensioning force.

For example, the locking surface of the locking part extending towards the upper side of the floor panel extends in distal direction towards the upper side of the floor panel.

The inventor has found that the ease of installation of the floor panels which have to be coupled with a tensioning force is promoted in the case that the locking surfaces, in coupled condition, define a maximally inclined tangent line, which at most forms an angle of 85 degrees with a straight line parallel to the installation plane, wherein the tangent line extends towards the upper side of the floor panel, in distal direction in respect to the receiving hook. It has proven particularly advantageous when said angle is at most 80 degrees, wherein most preferably said hook is approximately 75 degrees.

Preferably, the coupling parts are configured such that they allow realizing a coupled condition between the floor panels, by means of a rotational movement of the one floor panel in respect to the other floor panel, around an axis parallel to the installation plane and perpendicular to the edges. Such configuration of the coupling parts allows coupling a plurality of such floor panels to each other by means of a fold-down movement, which movement shows the herein above-described advantages particularly well.

In view of the fact that the present invention allows minimizing the risk of penetrating moisture and dust, it is primarily applied in an advantageous manner with floor panels, the core of which is at least partially composed of wood-based materials, such as MDF, HDF, or Wood Plastic Composite or WPC.

However, the invention can also be applied in an advantageous manner with floor panels which comprise a core based on synthetic material, wherein a variety of synthetic materials can be applied, such as thermoplastics, elastomers, polyesters and the like. A particular type of synthetic material-based floor panels, wherein the invention can be applied in an advantageous manner, are the so-called LVT floor panels.

The floor panels preferably have an overall thickness which is situated between 4 and 15 mm. Such thickness allows realizing the floor panels still stable enough. Most preferably, the overall thickness is situated between 5 and 12 mm, wherein an overall thickness of approximately 8 mm has proven to be an ideal value for realizing the elastically bent lip described herein above.

The floor panels of the present invention primarily relate to decorative floor panels. Preferably, they relate to floor panels comprising a top layer, wherein the top layer comprises at least a decor and a transparent wear layer.

With the intention of better showing the characteristics of the invention, herein below, as an example without any limitative character, some preferred embodiments are described, with reference to the accompanying drawings, wherein:

- Figure 1 in top view represents a set of oblong rectangular floor panels, wherein the floor panels are in a not-coupled or not-installed condition;
- Figure 2 represents a cross-section according to line II-II in figure 1;
- Figure 3 represents a cross-section according to line III-III in figure 1;
- Figure 4 represents how a plurality of the floor panels of figure 1 can be coupled to each other;
- Figure 5, in an enlarged view, represents the edges from figure 2, however, in the coupled condition of the floor panels;
- Figure 6 represents a step in the coupling movement of the edges at the short sides of the floor panels from figure 1;

- Figure 7 represents how the floor panels from figure 1 can be uncoupled at the edges of their short sides by means of a pivoting movement; and
- Figures 8 through 11 represent alternatives to the embodiment of the edges of the short sides of the floor panels from figure 1.

Figure 1, in top view, represents a set of floor panels 1A-1B for forming a floor covering, wherein the floor panels 1A-1B here are oblong rectangular and thus comprise a pair of short sides and a pair of long sides. The floor panels 1A-1B are represented in a not-coupled or not-installed condition.

The opposite short sides of the floor panels 1A-1B form edges 2-3 which are provided with coupling parts 4-5. Although here opposite edges 2-3 of two floor panels 1A-1B are concerned, it is clear that these edges 2-3 can also relate to edges of one and the same floor panel, which then relate to opposite edges of that floor panel.

The long sides of the floor panels 1A-1B form edges 6-7, which are provided with coupling parts 8-9.

Figure 2 represents a cross-section according to line II-II in figure 1. Thus, figure 2 represents a cross-section wherein the coupling parts 4-5 on the short sides of the floor panels 1A-1B are visible.

The floor panels 1A-1B each comprise an upper side 10, a lower side 11, and a core 12 extending between the upper and lower sides 10-11.

The floor panels 1A-1B relate to decorative floor panels, which comprise a top layer 43, wherein the top layer comprises at least a decor and a transparent wear layer.

The coupling part 4 of the one floor panel 1A is realized as a hook-shaped part 13 directed towards the lower side 11 of the floor panel 1A, herein below denominated looking hook 13.

The coupling part 5 of the other floor panel 1B is realized as a hook-shaped part 14 directed towards the upper side 10 of the floor panel 1B, herein below denominated receiving hook 14.

The hook-shaped parts 13-14 substantially are made from the material of the core 12 of the floor panels 1A-1B and substantially are made in one piece therewith. Here, the hook-shaped parts 13-14 even are made entirely from the material of the core 12, and in one piece therewith, with the exception of the insertion piece 19. To this aim, the hook-shaped parts 13-14 can be manufactured, for example, from the material of the core 12 by means of milling treatments, which is an economically advantageous and efficient manner of manufacturing the hook-shaped parts 13-14.

The locking hook 13 comprises a lip 15 which is provided with a locking part 16 extending towards the lower side 11 of the floor panel 1A.

The receiving hook 14 comprises a lip 17 which is provided with a locking part 18 extending towards the upper side 10 of the floor panel 1B.

As illustrated by means of the coupling part 4 represented in dotted line, the coupling parts 4-5 are configured such that they allow realizing a coupled condition between the floor panels 1A-1B, by means of a substantially straight coupling movement M of the one floor panel 1A in respect to the other floor panel 1B, according to a direction substantially perpendicular to an installation plane.

More particularly, the coupling parts 4-5 here are configured such that they also allow realizing a coupled condition between the floor panels 1A-1B, by means of a rotational movement of the one floor panel 1A in respect to the other floor panel 1B, around an axis parallel to the installation plane and perpendicular to the edges 2-3, in order to be able to perform the fold-down movement, which will be described in greater detail in respect to figure 4.

In the coupled condition of the floor panels 1A-1B, which is illustrated in greater detail in figure 5, the coupling parts 4-5 effect a locking in the direction H parallel to the installation plane and perpendicular to the aforementioned edges 2-3, as well as a locking in the direction V perpendicular to the installation plane.

Here, the locking parts 16 and 18 perform the locking in the direction H parallel to the installation plane and perpendicular to the aforementioned edges 2-3.

The locking in the direction V perpendicular to the installation plane is effected by means of locking elements 19-20. The locking element 19 here is realized as a

separate insertion piece or insert, as known as such from, for example, the herein above-mentioned WO '804.

The insert 19 here is provided in a groove 26, which is present in a distal side 21 of the locking hook 13. This offers the advantage that such groove 26 does not have to be provided in the receiving hook 14, which then as a result thereof can be made strong and can render sufficient stability to the lip 17.

However, it is not excluded that such insert 19 is provided in a groove which is present in a proximal side 23 of the receiving hook 14, which then preferably, instead of an upward-directed part 27, comprises a downward-directed part.

The part 27 is elastically movable, for example, by elastic bending and/or compression, and during the coupling movement performs a lateral movement, illustrated in greater detail in figure 6.

It is clear that here, and also in general, by the term "lateral movement" a sideward movement is meant which has at least a movement component in the direction parallel to the installation plane and perpendicular to the edges 2-3.

It should be noted that the part 27 here primarily, starting from a relaxed or initial condition, will perform a movement in the direction towards the floor panel 1A, after which the part 27 subsequently will at least partially relaxate towards a locking condition and herein will move in the direction towards the floor panel 1B.

In the locking condition, the part 27 works in conjunction with the locking element 20 at the other floor panel 20, shown in more detail in figure 5. Preferably, the part 27 relaxates only partially, as a result of which it is at least partially tensioned in the locking condition and realizes a tensioning force.

The insert 19 here is provided in the groove 26 by means of an attachment part 28, which can be clamped in this groove 26, for example, in that the part 28 is made not precisely fitting with the groove 26.

Here, the attachment part 28 more particularly is connected to the movable part 27 by means of a connection part 29.

More particularly, the insert 19 here is made as a coextruded strip, wherein the connection part 29 is manufactured of a softer or more elastic material than the material of the parts 27 and 28, which principle is known as such from, for example, the herein above-mentioned WO '153.

The lip 17 of the receiving hook 14 comprises a bridge part 37 connected to the core 12 of the floor panel 1B, and an end part 38 connected to the bridge part 37, to which end part the locking part 18 extending towards the upper side of the floor panel is belonging.

The bridge part 37 comprises an upper side provided with a recess 39. The recess 39, viewed according to the direction parallel to the upper or lower side 10-11 of the floor panel 1B and perpendicular to the edge 3, is situated at a distance from there, where the bridge part 37 is connected to the core 12 of the floor panel 1B, and from there, where the bridge part 37 is connected to the end part 38.

There, where the recess 39 is provided, the lip 17 has its minimum thickness D1, which preferably is at least 1/5 times and at most 1/3 times the overall thickness of the floor panel 1B. More particularly, the minimum thickness D1 here is at most 1/4 times the overall thickness T of the floor panel 1B.

There, where the bridge part 37 is connected to the core 12 of the floor panel 1B and there, where it is connected to the end part 38, it is made more rigid or thicker than there, where the aforementioned recess 39 is provided.

There, where the bridge part 37 is connected to the core 12, said bridge part has a thickness D2 which is at least 1/5 times and preferably at least 1/4 times the overall thickness T of the floor panel 1B.

There, where the bridge part 37 is connected to the end part 38, said bridge part has a thickness D3 which is at least 1/5 times and preferably at least 1/4 times the overall thickness T of the floor panel 1B.

That the bridge part 37 is made more rigid or thicker in the specific zones offers the advantage that the lip 17 is strong and can withstand possible loads which it is subjected to, in particular in the zones. Moreover, the additional advantage is obtained that, in that the bridge part 37 there, where it is connected to the end part

38, is made thicker, the locking surface 42 can be lifted, i.e. can be brought towards a higher or more upward position, which promotes the smooth pivoting apart of the floor panels, illustrated in more detail in figure 7.

The length L of the lip 17, measured between the vertical closing surface VS and the distal end of the lip 17, is at least 1 time and at most 3/2 times the overall thickness T of the floor panel 1B. In particular, the length L here is at most 4/3 times the overall thickness T of the floor panel 1B.

The lip 17 of the receiving hook 14 comprises a lower side which is free from recesses or grooves, or weakened parts in general.

The locking part 18 defines a point P situated most towards the upper side 10 of the floor panel 1B, which point is located in the lower half of the floor panel 1B. Such rather low designed locking part 18, amongst others, offers the advantage that the pivoting apart of the floor panels 1A-1B, illustrated in greater detail in figure 7, can be performed in a smooth manner.

Figure 3 represents a cross-section according to line III-III in figure 1. Thus, here a cross-section is represented wherein the coupling parts 8-9 on the long sides of the floor panels 1B are visible.

More particularly, the coupling parts 8-9 are realized as a tongue 30 and a groove 31, respectively, wherein the groove 31 is bordered by an upper lip 32 and a lower lip 33, which lower lip 33 extends beyond the distal end of the upper lip 32. The tongue 30 and the groove 31 are provided with lock-up parts 34-35. In the coupled condition, they effect the locking in the direction parallel to the installation plane and perpendicular to the edges 6-7.

As illustrated by the coupling part 8 represented in dotted line, the coupling parts 8-9 are configured such that they allow realizing the coupled condition between the floor panels 1A-1B, by means of a rotational movement W of the one floor panel 1A in respect to the other floor panel 1B, according to a direction parallel to the installation plane and the edges 6-7.

Locking tongue and groove connections, such as those described herein above in respect to figure 3, are known as such, amongst others, from the already mentioned

herein above WO '834. From that document, it is known that such tongue and groove connections can be provided with pretension, i.e., that they, in the coupled condition, realize a tensioning force pressing the coupled edges towards each other, for example, by means of an elastic bending of the lower lip. Herein, it is noted that with such locking tongue and groove connections the pretension poses less difficulties in respect to the smoothness of installation, as they are coupled by means of a pivoting or rotational movement, as described herein above.

Figure 4 represents how a plurality of the floor panels of figure 1 can be coupled by means of the so-called fold-down movement F, which as such is known, amongst others, from WO 01/75247 A1 and, already mentioned herein above, WO '153.

As illustrated, the floor panel 1A is coupled at its long side to an already installed floor panel 1C from a preceding row, by means of a pivoting movement, and at the same time is coupled at its short side to an already installed floor panel 1B from the same row, by means of the same pivoting movement, which is also called a scissor movement.

It is noted that the fold-down movement in practice mostly is preceded by a shifting movement of the floor panel 1A in respect to the floor panel 1C, along the long sides of these floor panels 1A and 1C, wherein the tongue during this shifting movement already is partially introduced into the groove. Herein, the floor panel 1A is in an inclined condition.

The floor panels 1A-1B-1C here are represented as perfectly rectangular floor panels, i.e. the short sides are perpendicular to the long sides. However, in practice this is not always the case. The standard EN 13329 namely allows a deviation from perpendicularity of 0.2 mm over the length of the side. It is clear that, due to this allowed deviation, performing the fold-down movement can be impeded; certainly at the sides where the coupling parts are realized in the form of hooks, here, thus, at the short sides, as these hooks due to the non-perpendicularity are difficult to engage into each other, certainly in the case of hooks made overlapping, which is the case with pretension.

Now, the inventor has found that the smoothness of installation still can be guaranteed by means of the herein above-described measures and the characteristics explained herein below in greater detail by means of figures 5 and 6.

Figure 5 in an enlarged view represents the edges 2-3 from figure 2, however, in the coupled condition of the floor panels 1A-1B.

As made visible, the coupling parts 4-5 are configured such that they, in coupled condition, realize a tensioning force pressing the coupled edges 2-3 towards each other, by means of an elastic bending of the lip 17 of the receiving hook 14.

Herein, the lip 17 has a maximum bending VM of at most 0.0625 times the overall thickness T of the floor panel 1B and this maximum bending here is specifically equal to approximately 0.0125 times the overall thickness of the floor panel 1B. The inventor has found that such maximum bending VM allows realizing an effective tensioning force which presses the coupled edges 2-3 towards each other, and that the smoothness of installation still can be guaranteed.

Herein, it is noted that the maximum bending VM of the lip 17 has to be understood as the maximum bending in respect to the resting condition of the lip 17, i.e. in respect to the condition of the lip 17 in not-coupled or not-installed condition of the floor panels 1A-1B, which is represented in figure 2.

Here, the bending of the lip 17 relates to a downward bending, wherein the lip 17 partially is situated lower than a level defined by the lower side 11 of the floor panel 1A to which the locking hook 13 is belonging.

Moreover, the bending relates to a bending continuously increasing in distal direction in respect to the receiving hook. By this is meant that the lip 17 is bent out more and more in distal direction, which in figure 5, for example, is represented by a more and more diminishing distance between the lower side of the lip 17 and the represented dotted line. The maximum bending VM then occurs at the distal end of the lip 17.

Such continuously increasing bending offers the advantage that the tension to which the lip 17 is subjected, can be spread over the length of this lip 17, and that an effective tensioning force can be realized without a noteworthy risk of breaking or damage of the lip 17.

Thus, the lip 17 preferably is bent over at least 25%, and still better over 50%, of its length.

As already described herein above, also the coupling parts 8-9 on the long edges 6-7 can be provided with pretension, wherein a tensioning force is created, which presses the coupled edges 6-7 towards each other, for example, by means of an elastic bending of the lower lip 33.

Herein, it is preferred that the average degree of bending of the lip 17 of the receiving hook 14, viewed over the length of the coupled edges 2-3, is different from, and preferably larger than, the average degree of bending of the lip 33 belonging to the coupling parts 8-9 of the adjacent edges 6-7, seen over the length of the coupled adjacent edges 6-7.

It is noted that by the length of the edges here the dimension of the edges in a direction parallel to these edges is meant.

That the bending of the lip 17 is larger than the bending of the lip 33, offers the advantage that a smooth installation can be guaranteed, whereas the formation of gaps on the coupled edges 2-3 and 6-7 can be counteracted in an optimum manner, certainly with oblong rectangular floor panels, such as those from figure 1.

On the one hand, it is advantageous that the bending of the lip 33 is relatively small, and smaller than the bending of the lip 17, as this allows smoothly performing the shifting movement of the floor panels 1A and 1C along their long sides, already described herein above, prior to the actual fold-down movement. On the other hand, it is advantageous to perform the bending of the lip 17 relatively large, and larger than the bending of the lip 33, as this results in a reduction of the risk of the penetration of moisture or dust at the short sides of the coupled floor panels 1A-1B.

As mentioned earlier in respect to figure 2, the movable part 27 of the insert 19 in the locking position can be partially tensioned, such that it realizes a tensioning force. This tensioning force provides for that the risk of height differences between the floor panels 1A-1B can be minimized or even excluded.

The tensioning force delivered by the part 27 here comprises at least a force component which pushes the coupled edges 2-3 out of each other, however, wherein this force component is smaller than the force component of the tensioning

force delivered by the lip 17, which presses the coupled edges towards each other, such that the coupled edges 2-3 still are pressed towards each other.

At its distal side 22, the locking part 18 is free from locking elements. In the coupled condition, even a room or space 40 is formed between the distal side 22 and the opposite edge 2. This space 40 offers room for the elastic bending of the lip 17.

In the coupled condition, the locking surfaces 41-42 at the proximal sides 24-25 of the locking parts 16 and 18 cooperate such that they effect the locking in the direction H parallel to the installation plane and perpendicular to the edges 2-3. They are manufactured from the material of the core 12 of the floor panels 1A-1B and are made in one piece therewith.

The locking surface 42 extends in distal direction towards the upper side 10 of the floor panel 1B.

The locking surfaces 41-42 define a maximally inclined tangent line R, which forms an angle A of at most 85 degrees with a straight line parallel to the installation plane, wherein the tangent line R extends towards the upper side 10, in distal direction in respect to the receiving hook 14. Here, the angle A is equal to approximately 75 degrees.

The bridge part 37 also defines a support surface 45, which here more particularly is made horizontal. In the coupled condition of the floor panels 1A-1B, the locking part 16 rests on this support surface 45. The support surface also serves as a reference.

It is advantageous that this support surface 45 is situated in that zone of the bridge part 37 which is made rigid/thicker and moreover little or not at all experiences the elastic bending of the lip 17. So, this support surface 45, which also functions as a reference, always can be well defined.

Figure 6 represents a step in the coupling movement of the edges 2-3 of the floor panels 1A-1B from figure 1.

As represented, the coupling parts 4-5 are configured such that at least a portion of the locking part 16 fits in an opening 36 defined between the locking part 18 and the

proximal side 23 of the receiving hook 14, without having to elastically bend the lip 17 for this purpose.

In other words, the hook-shaped parts 13-14, in the step represented in figure 6, already are situated in a partially engaged condition of the hooks 13-14, without the lip 17 being elastically bent for this purpose. From this partially engaged condition, the elastic bending of the lip 17 then can be initiated, in particular by pressing the locking hook 13, from the position represented in figure 6, further downward.

It is clear that the bending of the lip 17 here then is initiated by a mutual interaction of the proximal sides 24-25 of the locking parts 16 and 18.

Figure 7 represents how the floor panels 1A-1B, starting from the coupled condition, can be uncoupled.

The coupling parts 4-5 are configured such that they allow uncoupling the floor panels 1A-1B, starting from the coupled condition, by means of a rotational movement W1 of the one floor panel 1A around the other floor panel 1B, around an axis parallel to the installation plane and the edges 2-3. In this rotational movement W1 the upper sides 10 of the floor panels 1A-1B are moved towards each other.

As illustrated in figure 7, the rotational movement W1 can be combined with an elastic bending of the lip 17 of the receiving hook 14.

Figures 8 through 11 show more alternatives of the embodiment of the edges 2-3 of the short sides of the floor panels 1A-1B from figure 1.

Figure 8 represents that the lip 17 of the receiving hook 14 can be provided with an elasticity groove 44 in order to increase the elasticity of the lip 17.

The elasticity groove 44 here is provided in a lower side of the lip 17 and extends in distal direction up to the distal end of the lip 17. In proximal direction, the groove 44 more particularly extends to beyond the locking surfaces 41-42 of the locking parts 16 and 18.

It is noted that, as already mentioned herein above, the lower side of the lip 17 preferably is free from grooves or recesses, in order to guarantee the strength of the lip 17.

Figure 9 shows that the elasticity groove 44 can be provided in a proximal side 23 of the receiving hook. The groove 44 then extends more particularly into the core of the floor panel 1B.

It is also noted that the groove 44, provided in the proximal side 23, prolongs the actual length of the lip 17.

Figure 10 represents an alternative insertion piece 19, which insertion piece 19 is known as such from the herein above-mentioned WO '893. Here, this relates to a displaceable tongue, which is provided in a displacement groove.

Although the insertion piece 19 here is provided in a groove present in the distal side 21 of the locking hook 13, according to an alternative the insertion piece 19 can be provided in a groove present in the proximal side 23 of the receiving hook 14. In that case, it can be advantageous to make the displacement groove inclined, such that the insertion piece 19 becomes seated inclined in the floor panel 1B.

Figure 11 represents that the locking elements 19-20 can be manufactured from the material of the core 12 of the floor panels 1A-1B, and in one piece therewith. Here, the locking in the direction V perpendicular to the installation plane thus is effected without the assistance of a separate insertion piece or insert.

Herein, the locking element 19 is made as a protrusion at the distal side 21 of the locking hook 13, whereas the locking element 20 is made as an undercut at the proximal side 23 of the receiving hook 14. However, the reverse is possible, too, wherein the locking element 19 is made as an undercut and the locking element 20 as a protrusion.

It is also noted that the floor panels 1A-1B, at their short and/or long sides, can be provided with a so-called bevel or chamfer at the upper edges, as is known as such from WO 01/96688 A1. Such bevel can facilitate the installation of the floor panels even more.

It is also noted that it can be advantageous to provide the coupled edges with a sealing, for example, at the proximal side 23 of the receiving hook 14 and/or at the distal side 21 of the locking hook 13. Such sealing can further reduce or even completely exclude the risk of penetration of moisture or dust.

It is also noted that, although not represented, for the separate insertion pieces 19 use can also be made of inserts which are used in so-called “side-push” systems, which as such are well-known in the art.

It is also noted that the dimensions mentioned in the present description, such as lengths and thicknesses, have to be interpreted in the not-coupled condition of the floor panels, if not stated otherwise.

The present invention is in no way limited to the herein above-described embodiments, on the contrary, such methods, floor panels and carrier material can be realized according to various variants, without leaving the scope of the present invention.

Claims.

1.- Set of floor panels for forming a floor covering, which comprises at least two floor panels (1A-1B), which each comprise an upper side (10), a lower side (11), and a core (12) extending between the upper and lower sides (10-11), and which each comprise an edge (2-3) provided with a coupling part (4-5), wherein the coupling parts (4-5) are configured such that they allow realizing a coupled condition between the floor panels (1A-1B) by means of a substantially straight coupling movement (M) of the one floor panel (1A) in respect to the other floor panel (1B), according to a direction substantially perpendicular to an installation plane; wherein the coupling parts (4-5) in the coupled condition effect a locking in the direction (H) parallel to the installation plane and perpendicular to said edges (2-3), as well as a locking in the direction (V) perpendicular to the installation plane; wherein the coupling part (4) of the one floor panel (1A) is made as a hook-shaped part (13) directed towards the lower side (11) of the floor panel (1A), herein below denominated locking hook (13), and the coupling part (5) of the other floor panel (1B) is made as a hook-shaped part (14) directed towards the upper side (10) of the floor panel (1B), herein below denominated receiving hook (14); wherein the hook-shaped parts (13-14) substantially are manufactured from the material of the core (12) of the floor panels (1A-1B) and substantially are made in one piece therewith; wherein the locking hook (13) comprises a lip (15) which is provided with a locking part (16) extending towards the lower side (11) of the floor panel (1A), and the receiving hook (14) comprises a lip (17) which is provided with a locking part (18) extending towards the upper side (10) of the floor panel (1B); and wherein the locking parts (16, 18), in the coupled condition, cooperate in such a manner that they effect at least the aforementioned locking in the direction (H) parallel to the installation plane and perpendicular to said edges (2-3); **characterized in that** the coupling parts (4-5) are configured such that they, in the coupled condition, realize a tensioning force pressing the coupled edges (2-3) towards each other, by means of an elastic bending of the lip (17) of the receiving hook (14); and that the lip (17) of the receiving hook (14), in the coupled condition, in the direction (V) perpendicular to the installation plane, has a maximum bending (VM) of at most 0.0625 times the overall thickness (T) of the floor panel (1A-1B).

2.- Set of floor panels according to claim 1, characterized in that said maximum bending (VM) is at most 0.05 times the overall thickness (T) of the floor panel (1A-

1B), and preferably is situated between 0.00625 and 0.025 times the overall thickness (T) of the floor panel (1A-1B), and still more preferably is approximately 0.0125 times the overall thickness (T) of the floor panel (1A-1B).

3.- Set of floor panels according to claim 1 or 2, characterized in that the elastic bending relates to a downward bending, wherein the lip (17) of the receiving hook (14) partially is situated lower than a level defined by the lower side (11) of the floor panel (1A) to which the locking hook (13) is belonging; that the elastic bending in distal direction in respect to the receiving hook (14) relates to a continuously increasing bending, wherein said maximum bending occurs at the distal end of the lip (17) of the receiving hook (14); and that the lip of the receiving hook is bent at least over 25%, and preferably at least over 50% of its length.

4.- Set of floor panels for forming a floor covering, which comprises at least two floor panels (1A-1B), which each comprise an upper side (10), a lower side (11), and a core (12) extending between the upper and lower sides (10-11), and which each comprise an edge (2-3) provided with a coupling part (4-5), wherein the coupling parts (4-5) are configured such that they allow realizing a coupled condition between the floor panels (1A-1B) by means of a substantially straight coupling movement (M) of the one floor panel (1A) in respect to the other floor panel (1B), according to a direction substantially perpendicular to an installation plane; wherein the coupling parts (4-5) in the coupled condition effect a locking in the direction (H) parallel to the installation plane and perpendicular to said edges (2-3), as well as a locking in the direction (V) perpendicular to the installation plane; wherein the coupling part (4) of the one floor panel (1A) is made as a hook-shaped part (13) directed towards the lower side (11) of the floor panel (1A), herein below denominated locking hook (13), and the coupling part (5) of the other floor panel (1B) is made as a hook-shaped part (14) directed towards the upper side (10) of the floor panel (1B), herein below denominated receiving hook (14); wherein the hook-shaped parts (13-14) substantially are manufactured from the material of the core (12) of the floor panels (1A-1B) and substantially are made in one piece therewith; wherein the locking hook (13) comprises a lip (15) which is provided with a locking part (16) extending towards the lower side (11) of the floor panel (1A), and the receiving hook (14) comprises a lip (17) which is provided with a locking part (18) extending towards the upper side (10) of the floor panel (1B); and wherein the locking parts (16, 18), in the coupled condition, cooperate in such a manner that they effect at least the aforementioned locking in the direction (H) parallel to the installation plane and perpendicular to said

edges (2-3); **characterized in that** the coupling parts (4-5) are configured such that they, in the coupled condition, realize a tensioning force pressing the coupled edges (2-3) towards each other, by means of an elastic bending of the lip (17) of the receiving hook (14); and that the coupling parts (4-5) are configured such that at least a portion of the locking part (16) extending towards the lower side of the floor panel fits into an opening (36) defined between the locking part (18) extending towards the upper side of the floor panel and a proximal side (23) of the receiving hook (14), without having to elastically bend the lip (17) of the receiving hook (14) for this purpose.

5.- Set of floor panels according to claim 4, characterized in that the elastic bending of the lip (17) of the receiving hook (14) can be initiated from an already partially engaged condition of the hook-shaped parts (13-14).

6.- Set of floor panels according to claim 4 or 5, characterized in that the elastic bending of the lip (17) of the receiving hook (14) can be initiated by a mutual interaction of proximal sides (24-25), more particularly locking surfaces, of the locking parts (16, 18).

7.- Set of floor panels for forming a floor covering, which comprises at least two floor panels (1A-1B), which each comprise an upper side (10), a lower side (11), and a core (12) extending between the upper and lower sides (10-11), and which each comprise an edge (2-3) provided with a coupling part (4-5), wherein the coupling parts (4-5) are configured such that they allow realizing a coupled condition between the floor panels (1A-1B) by means of a substantially straight coupling movement (M) of the one floor panel (1A) in respect to the other floor panel (1B), according to a direction substantially perpendicular to an installation plane; wherein the coupling parts (4-5) in the coupled condition effect a locking in the direction (H) parallel to the installation plane and perpendicular to said edges (2-3), as well as a locking in the direction (V) perpendicular to the installation plane; wherein the coupling part (4) of the one floor panel (1A) is made as a hook-shaped part (13) directed towards the lower side (11) of the floor panel (1A), herein below denominated locking hook (13), and the coupling part (5) of the other floor panel (1B) is made as a hook-shaped part (14) directed towards the upper side (10) of the floor panel (1B), herein below denominated receiving hook (14); wherein the hook-shaped parts (13-14) substantially are manufactured from the material of the core (12) of the floor panels (1A-1B) and substantially are made in one piece therewith; wherein the locking hook

(13) comprises a lip (15) which is provided with a locking part (16) extending towards the lower side (11) of the floor panel (1A), and the receiving hook (14) comprises a lip (17) which is provided with a locking part (18) extending towards the upper side (10) of the floor panel (1B); and wherein the locking parts (16, 18), in the coupled condition, cooperate in such a manner that they effect at least the aforementioned locking in the direction (H) parallel to the installation plane and perpendicular to said edges (2-3); **characterized in that** the coupling parts (4-5) are configured such that they, in the coupled condition, realize a tensioning force pressing the coupled edges (2-3) towards each other, by means of an elastic bending of the lip (17) of the receiving hook (14); and that the lip (17) of the receiving hook (14) has a minimum thickness (D1), which is at least 1/5 times and at most 1/3 times the overall thickness (T) of the floor panel (1A-1B); and that the length (L) of the lip (17) of the receiving hook (14), measured between the vertical closing surface (VS) and the distal end of the lip (17) of the receiving hook (14), is at least 1 time and at most 3/2 times the overall thickness (T) of the floor panel (1A-1B).

8.- Set of floor panels according to claim 7, characterized in that said minimum thickness (D1) is at most 0.3 times the overall thickness (T) of the floor panel (1A-1B) and preferably is at most 1/4 times the overall thickness (T) of the floor panel (1A-1B).

9.- Set of floor panels according to claim 7 or 8, characterized in that said length (L) is at most 1.4 times the overall thickness (T) of the floor panel (1A-1B) and preferably is at most 4/3 times the overall thickness (T) of the floor panel (1A-1B).

10.- Set of floor panels for forming a floor covering, which comprises at least two floor panels (1A-1B), which each comprise an upper side (10), a lower side (11), and a core (12) extending between the upper and lower sides (10-11), and which each comprise an edge (2-3) provided with a coupling part (4-5), wherein the coupling parts (4-5) are configured such that they allow realizing a coupled condition between the floor panels (1A-1B) by means of a substantially straight coupling movement (M) of the one floor panel (1A) in respect to the other floor panel (1B), according to a direction substantially perpendicular to an installation plane; wherein the coupling parts (4-5) in the coupled condition effect a locking in the direction (H) parallel to the installation plane and perpendicular to said edges (2-3), as well as a locking in the direction (V) perpendicular to the installation plane; wherein the coupling part (4) of the one floor panel (1A) is made as a hook-shaped part (13) directed towards the

lower side (11) of the floor panel (1A), herein below denominated locking hook (13), and the coupling part (5) of the other floor panel (1B) is made as a hook-shaped part (14) directed towards the upper side (10) of the floor panel (1B), herein below denominated receiving hook (14); wherein the hook-shaped parts (13-14) substantially are manufactured from the material of the core (12) of the floor panels (1A-1B) and substantially are made in one piece therewith; wherein the locking hook (13) comprises a lip (15) which is provided with a locking part (16) extending towards the lower side (11) of the floor panel (1A), and the receiving hook (14) comprises a lip (17) which is provided with a locking part (18) extending towards the upper side (10) of the floor panel (1B); and wherein the locking parts (16, 18), in the coupled condition, cooperate in such a manner that they effect at least the aforementioned locking in the direction (H) parallel to the installation plane and perpendicular to said edges (2-3); **characterized in that** the coupling parts (4-5) are configured such that they, in the coupled condition, realize a tensioning force pressing the coupled edges (2-3) towards each other, by means of an elastic bending of the lip (17) of the receiving hook (14); and that the lip (17) of the receiving hook (14) comprises a bridge part (37) connected to the core (12) of the floor panel (1B), and an end part (38) connected to the bridge part (37), to which end part the locking part (18) extending towards the upper side of the floor panel is pertaining, wherein the bridge part (37) comprises an upper side provided with a recess (39) or groove, which recess (39), viewed according to the direction parallel to the upper or lower side of the floor panel (1B) and perpendicular to the edge (3), is situated at a distance from there, where the bridge part (37) is connected to the core (12) of the floor panel (1B), and from there, where the bridge part (37) is connected to the end part (38).

11.- Set of floor panels according to claim 10, characterized in that the lip (17) of the receiving hook (14) shows its minimum thickness (D1) there, where said recess (39) is provided.

12.- Set of floor panels according to claim 10 or 11, characterized in that the bridge part (37), there, where it is connected to the core (12) of the floor panel (1B), and there, where it is connected to the end part (38), is made more rigid or thicker than there, where said recess (39) is provided.

13.- Set of floor panels according to any of the claims 10 to 12, characterized in that the bridge part (37) comprises one or more of the following characteristics:

- there, where the bridge part (37) is connected to the core (12) of the floor panel (1B), it has a thickness (D2) which is at least 1/5 times, and preferably at least 1/4 times the overall thickness (T) of the floor panel (1B); and/or
- there, where the bridge part (37) is connected to the end part, it has a thickness (D3) which is at least 1/5 times, and preferably at least 1/4 times the overall thickness (T) of the floor panel (1B).

14.- Set of floor panels for forming a floor covering, which comprises at least two floor panels (1A-1B), which each comprise an upper side (10), a lower side (11), and a core (12) extending between the upper and lower sides (10-11), and which each comprise an edge (2-3) provided with a coupling part (4-5), wherein the coupling parts (4-5) are configured such that they allow realizing a coupled condition between the floor panels (1A-1B) by means of a substantially straight coupling movement (M) of the one floor panel (1A) in respect to the other floor panel (1B), according to a direction substantially perpendicular to an installation plane; wherein the coupling parts (4-5) in the coupled condition effect a locking in the direction (H) parallel to the installation plane and perpendicular to said edges (2-3), as well as a locking in the direction (V) perpendicular to the installation plane; wherein the coupling part (4) of the one floor panel (1A) is made as a hook-shaped part (13) directed towards the lower side (11) of the floor panel (1A), herein below denominated locking hook (13), and the coupling part (5) of the other floor panel (1B) is made as a hook-shaped part (14) directed towards the upper side (10) of the floor panel (1B), herein below denominated receiving hook (14); wherein the hook-shaped parts (13-14) substantially are manufactured from the material of the core (12) of the floor panels (1A-1B) and substantially are made in one piece therewith; wherein the locking hook (13) comprises a lip (15) which is provided with a locking part (16) extending towards the lower side (11) of the floor panel (1A), and the receiving hook (14) comprises a lip (17) which is provided with a locking part (18) extending towards the upper side (10) of the floor panel (1B); and wherein the locking parts (16, 18), in the coupled condition, cooperate in such a manner that they effect at least the aforementioned locking in the direction (H) parallel to the installation plane and perpendicular to said edges (2-3); **characterized in that** the coupling parts (4-5) are configured such that they, in the coupled condition, realize a tensioning force pressing the coupled edges (2-3) towards each other, by means of an elastic bending of the lip (17) of the receiving hook (14); and that the coupling parts (4-5) are configured such that they allow uncoupling the floor panels (1A-1B), starting from the coupled condition, by means of a rotational movement (W1) of the one floor panel (1A) around the other

floor panel (1B), around an axis parallel to the installation plane and the edges (2-3), wherein during said rotational movement (W1) the upper sides (10) of the floor panels (1A-1B) are moved towards each other.

15.- Set of floor panels for forming a floor covering, which comprises at least two floor panels (1A-1B), which each comprise an upper side (10), a lower side (11), and a core (12) extending between the upper and lower sides (10-11), and which each comprise an edge (2-3) provided with a coupling part (4-5), wherein the coupling parts (4-5) are configured such that they allow realizing a coupled condition between the floor panels (1A-1B) by means of a substantially straight coupling movement (M) of the one floor panel (1A) in respect to the other floor panel (1B), according to a direction substantially perpendicular to an installation plane; wherein the coupling parts (4-5) in the coupled condition effect a locking in the direction (H) parallel to the installation plane and perpendicular to said edges (2-3), as well as a locking in the direction (V) perpendicular to the installation plane; wherein the coupling part (4) of the one floor panel (1A) is made as a hook-shaped part (13) directed towards the lower side (11) of the floor panel (1A), herein below denominated locking hook (13), and the coupling part (5) of the other floor panel (1B) is made as a hook-shaped part (14) directed towards the upper side (10) of the floor panel (1B), herein below denominated receiving hook (14); wherein the hook-shaped parts (13-14) substantially are manufactured from the material of the core (12) of the floor panels (1A-1B) and substantially are made in one piece therewith; wherein the locking hook (13) comprises a lip (15) which is provided with a locking part (16) extending towards the lower side (11) of the floor panel (1A), and the receiving hook (14) comprises a lip (17) which is provided with a locking part (18) extending towards the upper side (10) of the floor panel (1B); and wherein the locking parts (16, 18), in the coupled condition, cooperate in such a manner that they effect at least the aforementioned locking in the direction (H) parallel to the installation plane and perpendicular to said edges (2-3); **characterized in that** the coupling parts (4-5) are configured such that they, in the coupled condition, realize a tensioning force pressing the coupled edges (2-3) towards each other, by means of an elastic bending of the lip (17) of the receiving hook (14); that each of the floor panels (1A-1B) comprises an edge (6-7) adjacent to its aforementioned edge (2-3), herein below denominated adjacent edge (6-7), which is provided with a coupling part (8-9), wherein the coupling parts (8-9) at the adjacent edges (6-7) are configured such that they allow realizing a coupled condition between the floor panels (1A-1B), wherein the coupling parts (8-9) at the adjacent edges (6-7), in the coupled condition, effect a locking in the direction (H)

parallel to the installation plane and perpendicular to the adjacent edges, as well as a locking in the direction (V) perpendicular to the installation plane, and wherein the coupling parts (8-9) at the adjacent edges (6-7) are configured such that they, in the coupled condition, realize a tensioning force pressing the adjacent coupled edges (6-7) towards each other, by means of an elastic bending of a lip (33) pertaining to the coupling parts (8-9) of the adjacent edges (6-7); and that, in the coupled condition of a plurality of the floor panels (1A-1B), the average degree of bending of the lip (17) of the receiving hook (14), viewed over the length of the coupled edges (2-3), differs from the average degree of bending of the lip (33) pertaining to the coupling parts (8-9) of the adjacent edges (6-7), viewed over the length of the coupled adjacent edges (6-7).

16.- Set of floor panels according to claim 15, characterized in that the average degree of bending of the lip (17) of the receiving hook (14) is larger than the average degree of bending of the lip (33) pertaining to the coupling parts (8-9) of the adjacent edges (6-7).

17.- Set of floor panels according to claim 15 or 16, characterized in that the coupling parts (8-9) at the adjacent edges (6-7) are configured such that they allow realizing a coupled condition between the floor panels (1A-1B), by means of a rotational movement (W) of the one floor panel in respect to the other floor panel (1B), according to a direction parallel to the installation plane and the adjacent edges (6-7), in such a manner that a plurality of the floor panels (1A-1B) can be coupled by means of a fold-down movement (F).

18.- Set of floor panels according to any of the claims 15 to 17, characterized in that the coupling parts (8-9) at the adjacent edges (6-7) are realized as a tongue (30) and a groove (31), wherein the groove (31) is bordered by an upper lip (32) and the aforementioned lip (33) belonging to the coupling parts (8-9) of the adjacent edges (6-7), herein below denominated lower lip (33); that the lower lip (33) extends beyond the distal extremity of the upper lip (32); and that the tongue (30) and the groove (31) are provided with lock-up parts (34-35), which in the coupled condition effect said locking in the direction parallel to the installation plane and perpendicular to the adjacent edges (6-7).

19.- Set of floor panels according to any of the preceding claims, characterized in that the locking part (18) extending towards the upper side (10) of the floor panel

(1B) defines a point (P) situated most towards the upper side (10) of the floor panel (1B), which point is located in the lower half of the floor panel (1B).

20.- Set of floor panels according to any of the preceding claims, characterized in that the lip (17) of the receiving hook (14) comprises a lower side which is free from recesses or grooves.

21.- Set of floor panels according to any of the preceding claims, characterized in that the locking in the direction (V) perpendicular to the installation plane, at the edges (2-3) to which the hook-shaped parts (13-14) belong, is effected by means of locking elements (19-20), of which at least one locking element (19) is made as a separate insertion piece or insert.

22.- Set of floor panels according to claim 21, characterized in that the insert (19) is provided in a groove (26) present in a distal side (21) of the locking hook (13).

23.- Set of floor panels according to claim 21 or 22, characterized in that the insert (19) comprises an elastically movable portion (27), which, during the coupling movement, performs a lateral movement and is brought from a relaxed condition or initial condition into a locking condition, in which the movable portion (27) works in conjunction with the locking element (20) at the other floor panel (1B).

24.- Set of floor panels according to claim 23, characterized in that said movable portion (27) in the locking condition is at least partially tensioned, such that the movable portion (27) realizes a tensioning force.

25.- Set of floor panels according to claim 24, characterized in that the tensioning force delivered by the movable portion (27) and the tensioning force delivered by the lip (17) of the receiving hook (14) are configured such that the coupled edges (2-3) are pressed towards each other.

26.- Set of floor panels according to claim 25, characterized in that the tensioning force delivered by the movable portion (27) comprises at least a force component which pushes the coupled edges (2-3) away from each other, wherein this force component is smaller than the force component of the tensioning force delivered by the lip (17) of the receiving hook (14), which tensioning force presses the coupled edges (2-3) towards each other.

27.- Set of floor panels according to any of the claims 21 to 26, characterized in that the insert (19) is realized as a coextruded strip.

28.- Set of floor panels according to any of the preceding claims, characterized in that the locking part (18) extending towards the upper side of the floor panel, at one distal side (22) thereof, is free from locking elements.

29.- Set of floor panels according to claim 28, characterized in that in the coupled condition of the floor panels (1A-1B) a room or space is formed between said distal side (22) and the opposite edge (2).

30.- Set of floor panels according to any of the preceding claims, characterized in that each of said locking parts (16, 18) is provided with a locking surface (41-42) at a proximal side (24-25) of the locking part (16, 18), wherein the locking surfaces (41-42) in the coupled condition cooperate such that they effect at least the locking in the direction (H) parallel to the installation plane and perpendicular to the edges (2-3); and that the locking surfaces (41-42) are manufactured from the material of the core (12) of the floor panels (1A-1B) and are made in one piece therewith.

31.- Set of floor panels according to claim 30, characterized in that the locking surface (42) of the locking part (18) extending towards the upper side of the floor panel extends, in distal direction, towards the upper side (10) of the floor panel (1B).

32.- Set of floor panels according to claim 30 or 31, characterized in that the locking surfaces (41-42), in the coupled condition, define a maximally inclined tangent line (R), which forms an angle (A) of at most 85 degrees with a straight line parallel to the installation plane, wherein the tangent line (R) extends towards the upper side (10) of the floor panel (1A), in distal direction in respect to the receiving hook (14).

33.- Set of floor panels according to claim 32, characterized in that said angle (A) is at most 80 degrees and preferably is approximately 75 degrees.

34.- Set of floor panels according to any of the preceding claims, characterized in that the coupling parts (4-5) are configured such that they allow realizing a coupled condition between the floor panels (1A-1B), by means of a rotational movement of

the one floor panel (1A) in respect to the other floor panel (1B), around an axis parallel to the installation plane and perpendicular to the edges (2-3), in such a manner that a plurality of the floor panels (1A-1B) can be coupled by means of a fold-down movement (F).

35.- Set of floor panels according to any of the preceding claims, characterized in that the core (12) of the floor panels (1A-1B) is at least partially composed of wood-based materials, such as MDF or HDF.

36.- Set of floor panels according to any of the preceding claims, characterized in that the floor panels (1A-1B) have an overall thickness (T) which is situated between 4 mm and 15 mm, preferably between 5 mm and 12 mm.

37.- Set of floor panels according to any of the preceding claims, characterized in that the floor panels (1A-1B) relate to decorative floor panels, which comprise a top layer (43), wherein the top layer comprises at least a decor and a transparent wear layer.

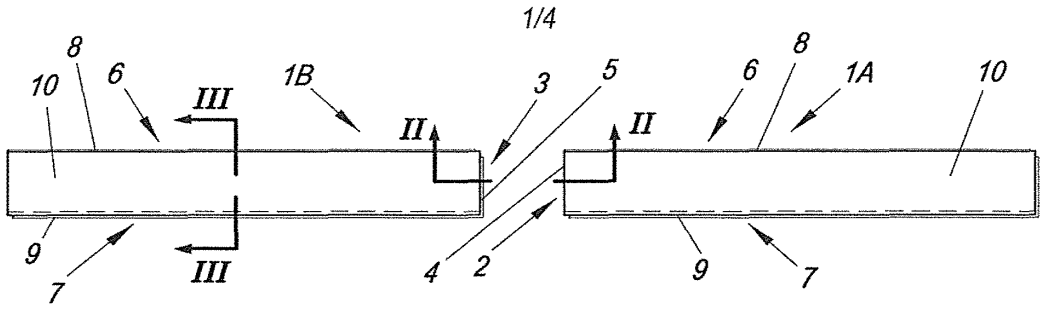
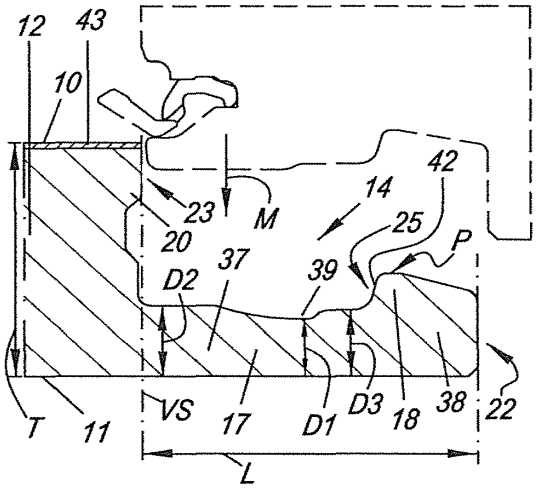


Fig. 1



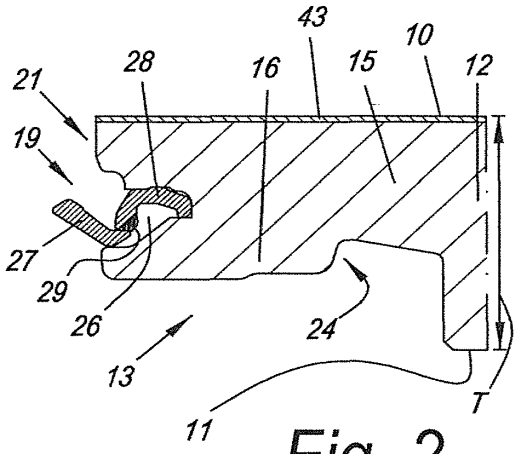


Fig. 2

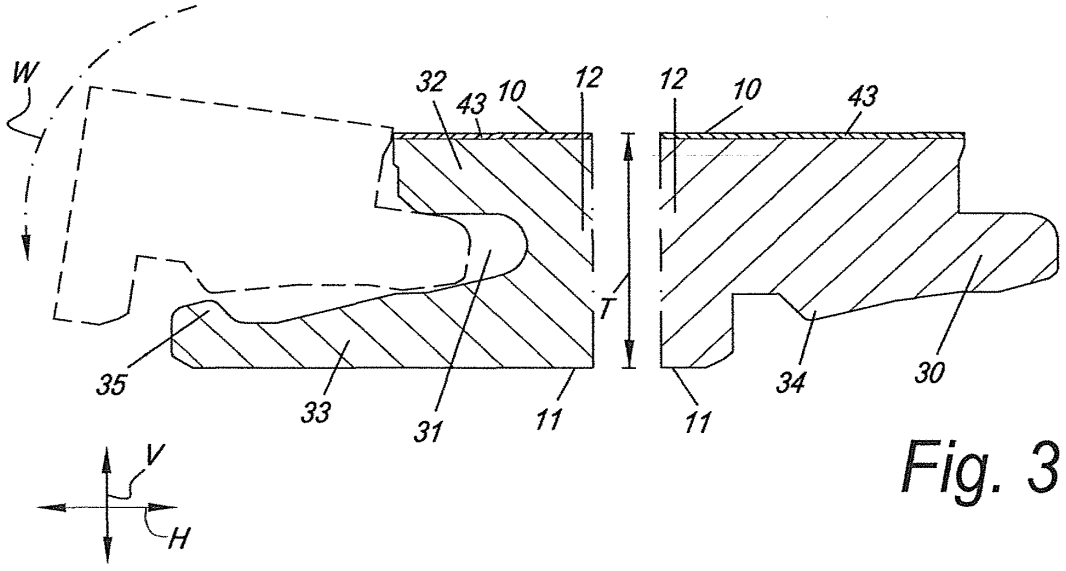
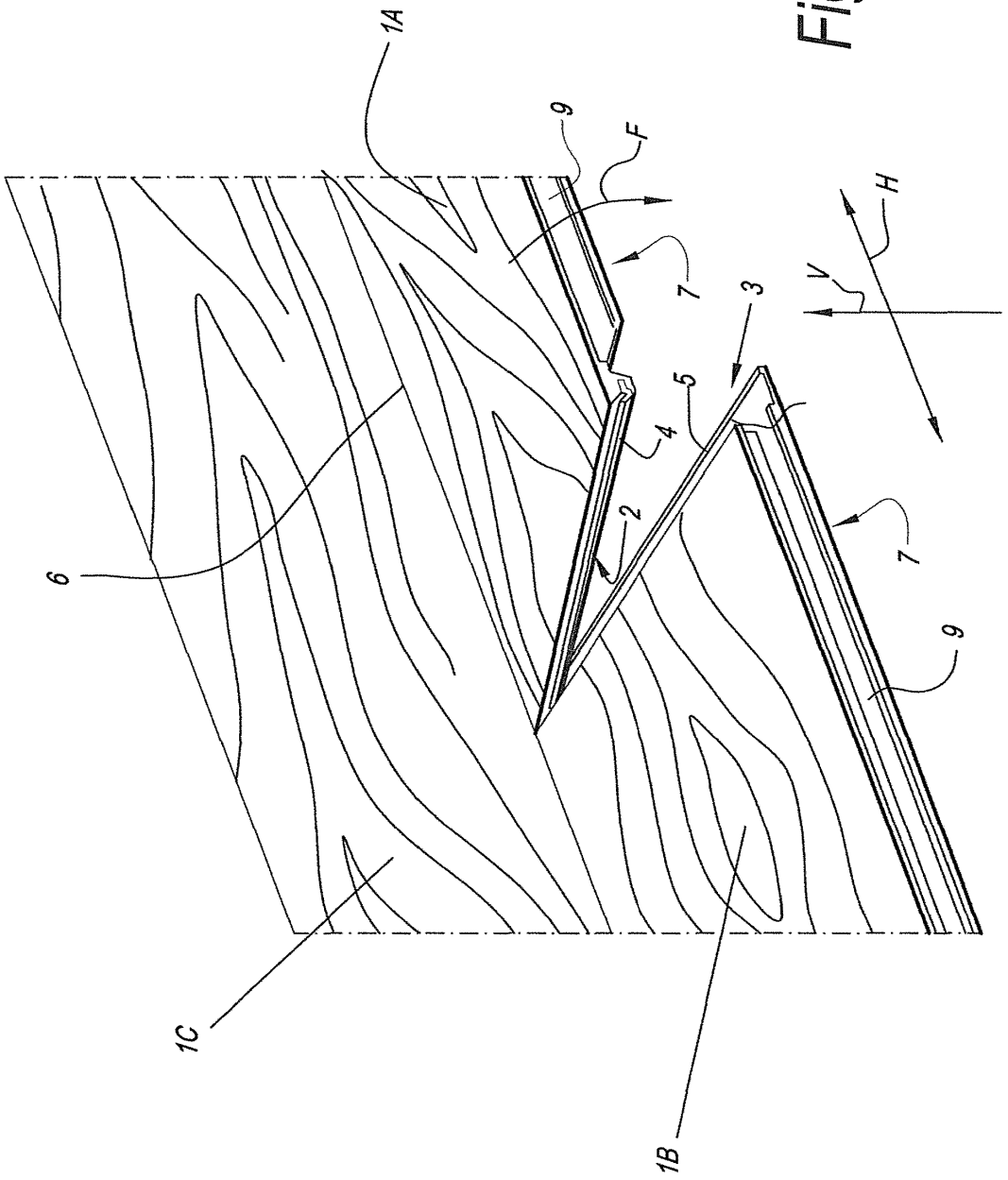


Fig. 3

Fig. 4



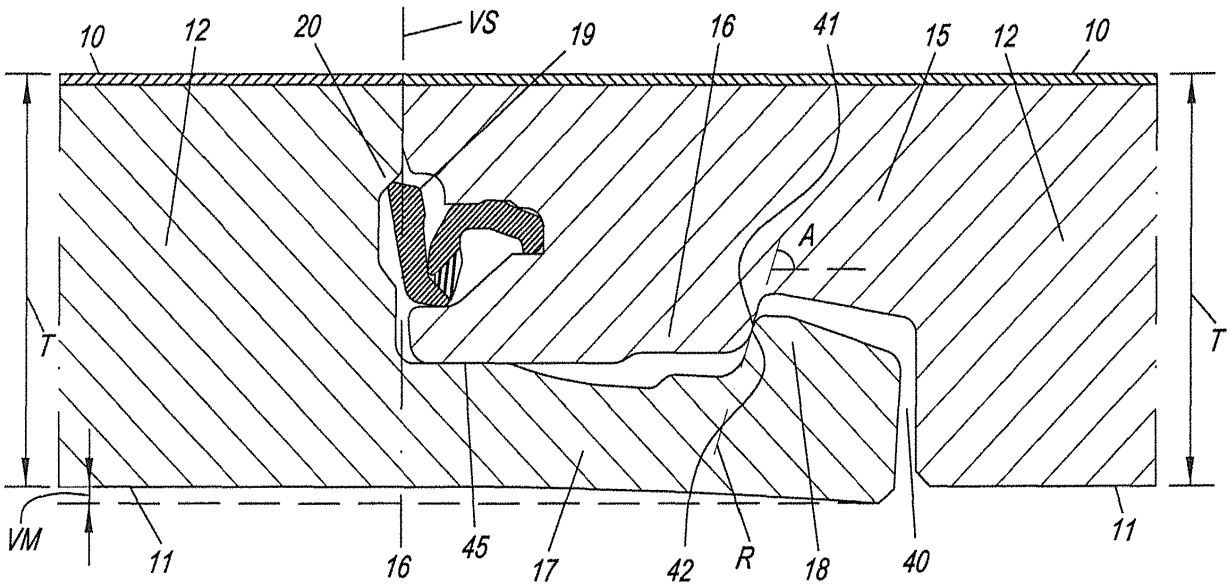
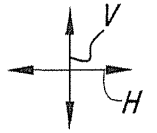


Fig. 5



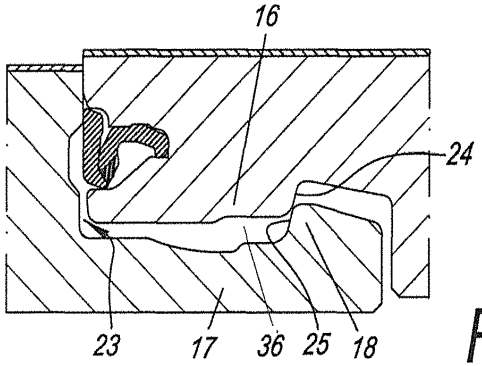


Fig. 6

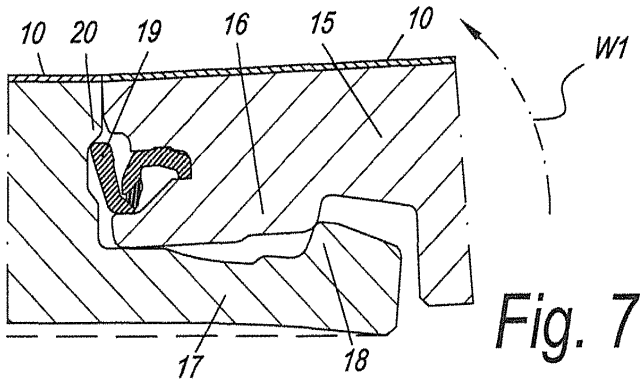


Fig. 7

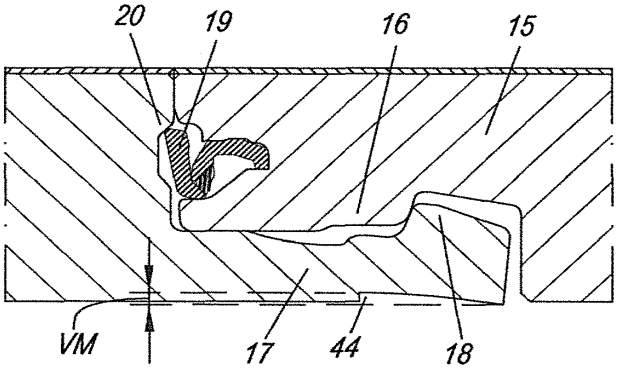


Fig. 8

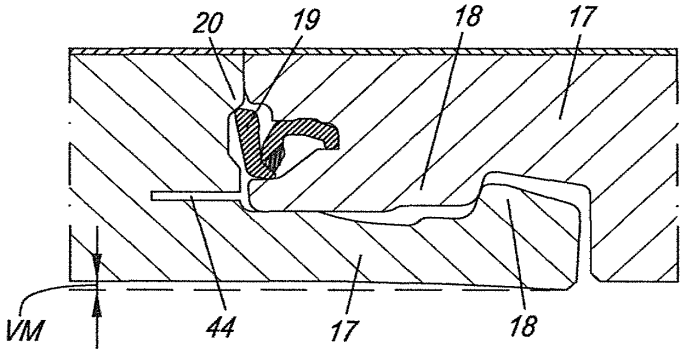


Fig. 9

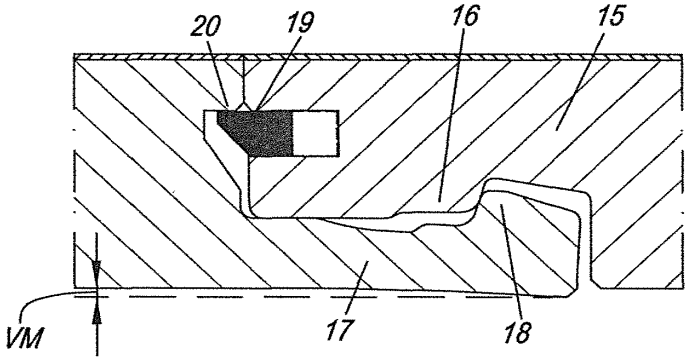


Fig. 10

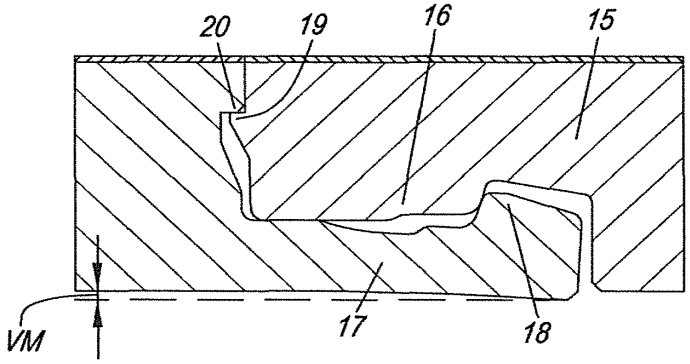


Fig. 11

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2016/056309

A. CLASSIFICATION OF SUBJECT MATTER
INV. E04F15/02
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)
E04F

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, 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	WO 97/47834 A1 (UNILIN BEHEER BV [NL]) 18 December 1997 (1997-12-18) page 19 - page 28; figures 22-25	1-3,7-37

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

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"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 January 2017	06/02/2017

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Topcuoglu, Sadik Cem

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		US 2008060309 A1	13-03-2008
		US 2008060310 A1	13-03-2008
		US 2008060311 A1	13-03-2008
		US 2008066416 A1	20-03-2008
		US 2010319292 A1	23-12-2010
		US 2011023405 A1	03-02-2011
		US 2013104487 A1	02-05-2013
		US 2014290174 A1	02-10-2014
		US 2015211238 A1	30-07-2015
		WO 9747834 A1	18-12-1997

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	JOINING SYSTEM FOR FLOOR PANELS
First Named Inventor/Applicant Name:	Bobby Markovski
Filer:	David V. Rossi/Shabana Alli-Arjune
Attorney Docket Number:	A676-3

Filed as Small Entity

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

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
BASIC NATIONAL STAGE FEE	2631	1	160	160
NATL STAGE SEARCH FEE - REPORT PROVIDED	2642	1	270	270
NATL STAGE EXAM FEE - ALL OTHER CASES	2633	1	400	400
Pages:				
Claims:				
Miscellaneous-Filing:				
OATH/DECL > 30 MOS FROM 371 COMMENCEMENT	2617	1	80	80
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		910

Electronic Acknowledgement Receipt	
EFS ID:	41029643
Application Number:	17052836
International Application Number:	PCT/EP2019/061431
Confirmation Number:	7468
Title of Invention:	JOINING SYSTEM FOR FLOOR PANELS
First Named Inventor/Applicant Name:	Bobby Markovski
Customer Number:	20999
Filer:	David V. Rossi/Shabana Alli-Arjune
Filer Authorized By:	David V. Rossi
Attorney Docket Number:	A676-3
Receipt Date:	04-NOV-2020
Filing Date:	
Time Stamp:	09:52:15
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$910
RAM confirmation Number	E2020A4052335548
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		02027858.PDF	1206614 8303ce92e905dd1b43522a9bc470f55b3be2edc2	yes	23
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Drawings-only black and white line drawings		20	23	
	Claims		17	19	
	Specification		3	16	
	Abstract		1	2	
Warnings:					
Information:					
2	Documents submitted with 371 Applications	02027860.PDF	52989 136b06d403341083e25aaed4614a73d3fac9abec	no	1
Warnings:					
Information:					
3	Application Data Sheet	02031391.PDF	102090 35f2c592db0ef6d0ead07ffeb7a2a49f05027809	no	8
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
4		02031390.PDF	145864 88e1ca66f80d7bad0356778a05c5f0f11e9c0fb1	yes	7
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	

	Applicant Arguments/Remarks Made in an Amendment		7	7	
	Claims		3	6	
	Specification		2	2	
	Preliminary Amendment		1	1	
Warnings:					
Information:					
5	Transmittal of New Application	02031393.PDF	193592 22adfab751e841b2104b45b57f915ff3a9a13676	no	3
Warnings:					
Information:					
6	Transmittal Letter	02031394.PDF	105667 db8f2310f69904f9b237287ced6a37577908eca6	no	1
Warnings:					
Information:					
7	Information Disclosure Statement (IDS) Form (SB08)	02031395.PDF	125023 d48745ed00d39a5005be4f56ebbbf52c9b3fc7c9	no	1
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
8	Other Reference-Patent/App/Search documents	02029834.PDF	393682 c526dedc51d813dcee0cdccefbbaa8357276d2d7	no	11
Warnings:					
Information:					
9	Foreign Reference	02029883.PDF	3672995 f84c733b4fcde81d5453634c7801cbb6f61bbd95	no	74
Warnings:					
Information:					

10	Foreign Reference	02029884.PDF	2151105 f20d937c059c04e9b5ea561a42e2762a72984a54	no	47
Warnings:					
Information:					
11	Fee Worksheet (SB06)	fee-info.pdf	36889 6bbab3142fbe77d15a49ee8c853f17544c041c46	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	8186510		

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.

PATENT COOPERATION TREATY PCT/EP2019/061431

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92*bis*.1 and Administrative Instructions, Section 422)

To:

AWA SWEDEN AB
Matrosgatan 1
211 18 Malmö
SUÈDE

Date of mailing *(day/month/year)*
09 March 2020 (09.03.2020)

Applicant's or agent's file reference
W121690005W2

IMPORTANT NOTIFICATION

International application No.
PCT/EP2019/061431

International filing date *(day/month/year)*
03 May 2019 (03.05.2019)

1. The following indications appeared on record concerning:

☒ the applicant ☐ the inventor ☐ the agent ☐ the common representative

Name and Address
IPENDOR AB
Mangårdsgatan 57
256 67 HELSINGBORG
Sweden

State of Nationality: SE
State of Residence: SE
Telephone No.:
Facsimile No.:
E-mail address:

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person ☒ the name ☐ the address ☐ the nationality ☐ the residence

Name and Address
VILOX AB
Mangårdsgatan 57
256 67 HELSINGBORG
Sweden

State of Nationality: SE
State of Residence: SE
Telephone No.:
Facsimile No.:
E-mail address:
☐ Notifications by e-mail authorized

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

☒ the receiving Office
☒ the International Searching Authority
☐ the Authority(ies) specified for supplementary search
☐ the International Preliminary Examining Authority
☒ the designated Offices concerned
☐ the elected Offices concerned
☐ other:

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer
Sevillano Carine
e-mail pct.team5@wipo.int
Telephone No. +41 22 338 74 05

Form PCT/IB/306 (January 2009) 1/PZLQP9E4SSJY30

PTO/AIA/14 (02-18)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	A676-3
	Application Number	
Title of Invention	JOINING SYSTEM FOR FLOOR PANELS	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Bobby		Markovski	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Helsingborg	Country of Residence [i]	SE

Mailing Address of Inventor:

Address 1	Harvgatan 2		
Address 2			
City	Helsingborg	State/Province	
Postal Code	254 48	Country [i]	SE

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Bengt		Rosander (Deceased)	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City		Country of Residence [i]	

Mailing Address of Inventor:

Address 1			
Address 2			
City		State/Province	
Postal Code		Country [i]	

Inventor 3 Remove

Legal Name

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	A676-3
	Application Number	
Title of Invention	JOINING SYSTEM FOR FLOOR PANELS	

Prefix	Given Name	Middle Name	Family Name	Suffix
	Magnus		Persson	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Helsingborg	Country of Residence [i]	SE

Mailing Address of Inventor:

Address 1	Handelsmansgatan 1a		
Address 2			
City	Helsingborg	**State/Province**	
Postal Code	252 49	**Country** [i]	SE

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

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	20999		
Email Address	Docket@haugpartners.com	Add Email	Remove Email

Application Information:

Title of the Invention	JOINING SYSTEM FOR FLOOR PANELS		
Attorney Docket Number	A676-3	**Small Entity Status Claimed**	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	4	**Suggested Figure for Publication (if any)**	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	A676-3
	Application Number	
Title of Invention	JOINING SYSTEM FOR FLOOR PANELS	

Publication Information:

☐	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
☐	**Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	20999		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	a 371 of international	PCT/EP2019/061431	2019-05-03

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)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	A676-3
	Application Number	
Title of Invention	JOINING SYSTEM FOR FLOOR PANELS	

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
1830152-3	SE	2018-05-04	

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

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.

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	A676-3
	Application Number	
Title of Invention	JOINING SYSTEM FOR FLOOR PANELS	

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	A676-3
	Application Number	
Title of Invention	JOINING SYSTEM FOR FLOOR PANELS	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

◉ Assignee	○ Legal Representative under 35 U.S.C. 117	○ Joint Inventor
○ Person to whom the inventor is obligated to assign.	○ Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	VILOX AB		
Mailing Address Information For Applicant:			
Address 1	Mangårdsgatan 57		
Address 2			
City	Helsingborg	**State/Province**	
Country	SE	Postal Code	256 67
Phone Number		Fax Number	
Email Address			

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

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	A676-3
	Application Number	
Title of Invention	JOINING SYSTEM FOR FLOOR PANELS	

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. ☒

Organization Name	VILOX AB

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1	Mangårdsgatan 57		
Address 2			
City	Helsingborg	**State/Province**	
Country i	SE	Postal Code	256 67
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/David V. Rossi/			Date (YYYY-MM-DD)	2020-11-04
First Name	David V.	Last Name	Rossi	Registration Number	36,659

Additional Signature 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	A676-3
	Application Number	
Title of Invention	JOINING SYSTEM FOR FLOOR PANELS	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

REMARKS

The specification is amended to add the lineage of the application.

Claims 1-15 are amended for additional clarity, to eliminate reference numerals, and to eliminate multiple dependencies.

No new matter has been added. Since none of these changes introduces new matter, entry of this amendment is warranted. Upon such entry, claims 1-15 will be pending, with claim 1 being in independent form and the remaining claims being dependent.

The filing fee has been calculated based upon these amendments to the claims.

An early examination on the merits is respectfully solicited.

General Authorization: No fee is believed to be due, however, the Commissioner is authorized to charge any fee deficiencies, and credit any overpayment, during the entire pendency of this application to Deposit Account 50 0320.

Date: November 4, 2020

Respectfully submitted,

Customer No. 20999
Haug Partners LLP
745 Fifth Avenue
New York, NY 10151

/David V. Rossi/
David V. Rossi, Reg. No. 36,659
Attorney for Applicant
Tel : (212) 588-0800

I4F Exhibit 1003 - 361

AMENDMENTS TO THE CLAIMS

Please amend the claims as indicated in the below listing of claims that will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS:

1. (Currently Amended) ~~Joining~~ A joining system for floor panels ~~(1)~~, the joining system comprising said floor panels (1) being provided with coupling parts ~~(20)~~ provided on at least two opposite sides of said floor panels ~~(30, 40)~~ for joining floor panels ~~(1)~~ together, said coupling parts ~~(20)~~ including a groove ~~(50)~~ and a tongue ~~(60)~~, where the groove ~~(50)~~ is shaped for insertion of a tongue ~~(60)~~ on an adjoining floor panel ~~(1)~~, said tongue ~~(60)~~ being shaped for locking engagement by means of integrated locking means ~~(70)~~ with the groove ~~(50)~~ in a direction perpendicular to said sides ~~(30, 40)~~ and parallel to a horizontal floor plane ~~(FP)~~ defined by the joined panels ~~(1)~~, said coupling parts ~~(20)~~ exerting a tension force towards each other in a mutually engaged position, the tension force being achieved by elastic compression of the material of the coupling parts ~~(20)~~, ~~characterized in that~~wherein:

[[-]] (i) the locking means ~~(70)~~ comprises dual consecutive locking recesses ~~(80, 90)~~ arranged in a lower portion ~~(95)~~ of the groove ~~(50)~~, a first locking recess ~~(80)~~ of which being located in an internally extending portion ~~(100)~~ within the groove, ~~(50)~~ and a second locking recess (90) of which being located in a lip portion ~~(110)~~ protruding from an entrance opening ~~(120)~~ of the groove ~~(50)~~,

[[-]] (ii) the locking means ~~(70)~~ further comprises dual consecutive locking lugs ~~(130, 140)~~ arranged in a lower portion ~~(150)~~ of the tongue ~~(60)~~ for horizontally interlocking engagement with said dual consecutive locking recesses ~~(80, 90)~~ in the groove ~~(50)~~, a first locking lug (130) of which ~~extending~~ extends downwardly from a lower tip portion ~~(160)~~ of the tongue, ~~(60)~~ and a second locking lug ~~(140)~~ of which ~~extending~~ extends downwardly from a root portion ~~(170)~~ of the tongue ~~(60)~~,

[[-]] ~~wherein~~ (iii) the first locking recess ~~(80)~~ and the first locking lug ~~(130)~~ are provided with matching curved horizontal locking surfaces, ~~(180, 190)~~ and

I4F Exhibit 1003 - 362

[[-]] ~~wherein (iv)~~ the second locking recess ~~(90)~~ and the second locking lug ~~(140)~~ are provided with matching inclined horizontal locking surfaces ~~(200, 210)~~.

2. (Currently Amended) ~~Joining~~ The joining system for floor panels ~~(1)~~ according to claim 1, ~~characterized in that~~wherein an intermediate transitional ridge ~~(230)~~ between the first locking lug ~~(130)~~ and the second locking lug ~~(140)~~ is located inside of the entrance opening ~~(120)~~ of the groove ~~(50)~~, said entrance opening ~~(120)~~ being located in a main vertical joint plane ~~(JP)~~ between two joined floor panels ~~(1)~~.

3. (Currently Amended) ~~Joining~~ The joining system for floor panels ~~(1)~~ according to claim 1, ~~characterized in that~~wherein an intermediate transitional ridge ~~(230)~~ between the first locking lug ~~(130)~~ and the second locking lug ~~(140)~~ is aligned with the entrance opening ~~(120)~~ of the groove ~~(50)~~, said entrance opening ~~(120)~~ being located in a main vertical joint plane ~~(JP)~~ between two joined panels (1).

4. (Currently Amended) ~~Joining~~ The joining system for floor panels ~~(1)~~ according to ~~any of the preceding claims~~ claim 1, ~~characterized~~ wherein in that the lower tip portion ~~(160)~~ of the tongue ~~(60)~~ is curved.

5. (Currently Amended) ~~Joining~~ The joining system for floor panels ~~(1)~~ according to claim 4, ~~characterized in that~~wherein the curvature of the curved lower tip portion ~~(160)~~ of the tongue ~~(60)~~ merges continuously with a corresponding curvature of the horizontal locking surface ~~(190)~~ of the first locking lug ~~(130)~~.

6. (Currently Amended) ~~Joining~~ The joining system for floor panels ~~(1)~~ according to ~~any of the preceding claims~~ claim 1, ~~characterized in that~~wherein the first locking recess ~~(80)~~ is shallower than the second locking recess ~~(90)~~.

I4F Exhibit 1003 - 363

7. (Currently Amended) ~~Joining~~ The joining system for floor panels ~~(1)~~ according to ~~any of the preceding claims 1 through 5~~ claim 1, ~~characterized in that~~wherein the depth ~~(d)~~ of the first locking recess ~~(90)~~ is less than half of the depth ~~(D)~~ of the second locking recess ~~(90)~~.

8. (Currently Amended) ~~Joining~~ The joining system for floor panels ~~(1)~~ according to ~~any of the preceding claims~~ claim 1, ~~characterized in that~~wherein an exit tangent inclination angle ~~(A)~~ of the curved horizontal locking surface ~~(180)~~ of the first locking recess ~~(80)~~ is less than the inclined locking angle ~~(B)~~ of the second locking recess ~~(90)~~.

9. (Currently Amended) ~~Joining~~ The joining system for floor panels ~~(1)~~ according to claim 8, ~~characterized in that~~wherein said exit tangent inclination angle ~~(A)~~ of the curved horizontal locking surface ~~(180)~~ of the first locking recess ~~(80)~~ is equal to or less than half the inclined locking angle ~~(B)~~ of the second locking recess ~~(90)~~.

10. (Currently Amended) ~~Joining~~ The joining system for floor panels ~~(1)~~ according to ~~any of the preceding claims~~ claim 1, ~~characterized in that~~wherein the curved horizontal locking surface ~~(180)~~ extends from a point located essentially directly below a radial center ~~(rc)~~ of the curved first locking recess ~~(80)~~ in a direction towards the second locking recess ~~(90)~~.

11. (Currently Amended) ~~Joining~~ The joining system for floor panels ~~(1)~~ according to ~~any of the preceding claims 3 through 10~~ claim 3, ~~characterized in that~~wherein the height ~~(h1)~~ of the intermediate transitional ridge ~~(230)~~ measured from a bottom plane ~~(BP)~~ of the floor panel ~~(1)~~ is equal to or less than the corresponding height ~~(h2)~~ of a corresponding inlet ridge ~~(240)~~ of the second locking recess ~~(90)~~.

12. (Currently Amended) ~~Joining~~ The joining system for floor panels ~~(1)~~ according to ~~any of the preceding claims~~ claim 1, ~~characterized in that~~wherein the length ~~(e1)~~ of a vertical locking

surface ~~(250)~~ of the tongue ~~(60)~~ is less than the corresponding length ~~(e2)~~ of a matching vertical locking surface ~~(260)~~ of the groove ~~(50)~~.

13. (Currently Amended) ~~Joining~~ The joining system for floor panels ~~(1)~~ according to ~~any of the preceding claims~~ claim 1, ~~characterized in that~~wherein the minimum thickness ~~(t)~~ between the first locking recess ~~(80)~~ and a bottom plane ~~(BP)~~ of the of the floor panel ~~(1)~~ exceeds a third of the total height ~~(H)~~ of the floor panel ~~(1)~~.

14. (Currently Amended) ~~Joining~~ The joining system for floor panels ~~(1)~~ according to ~~any of the preceding claims~~ claim 1, ~~characterized in that~~wherein the introduction angle ~~(C)~~ of the groove ~~(50)~~ is equal to or greater than 10 degrees.

15. (Currently Amended) ~~Joining~~ The joining system for floor panels ~~(1)~~ according to ~~any of the preceding claims~~ claim 1, ~~characterized in that~~wherein the length ~~(L1)~~ of the internally extending portion ~~(100)~~ within the groove ~~(50)~~ is less than the length ~~(L2)~~ of the lip portion ~~(110)~~ protruding from an entrance opening ~~(120)~~ of the groove ~~(50)~~.

IN THE SPECIFICATION:

On page 1, after the title and before the line beginning "TECHNICAL FIELD", please insert the following section, comprising section heading and paragraph:

--CROSS-REFERENCE TO RELATED APPLICATIONS

This application is the National Stage entry under 35 U.S.C. § 371 of International Application No. PCT/EP2019/061431 filed on May 3, 2019, published on November 7, 2019 under Publication Number WO 2019/211460 A1, which claims the benefit of priority under 35 U.S.C. § 119 of Sweden Patent Application Number 1830152-3 filed on May 4, 2018, the entireties of which are herein incorporated by reference.--

I4F Exhibit 1003 - 366

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Bobby Markovski et al.

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For: JOINING SYSTEM FOR FLOOR PANELS

745 Fifth Avenue
New York, NY 10151

PRELIMINARY AMENDMENT

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

Sir:

This Preliminary Amendment is being filed concurrently with the papers to enter the U.S. national stage in this application. Upon entry into the national stage and prior to calculation of the claims fee, as well as prior to examination on the merits, Applicant respectfully requests amendment of the application in view of the following:

Amendments to the Specification beginning on page 2 of this paper;

Amendments to the Claims beginning on page 3 of this paper; and

Remarks beginning on page 7 of this paper.

I4F Exhibit 1003 - 367

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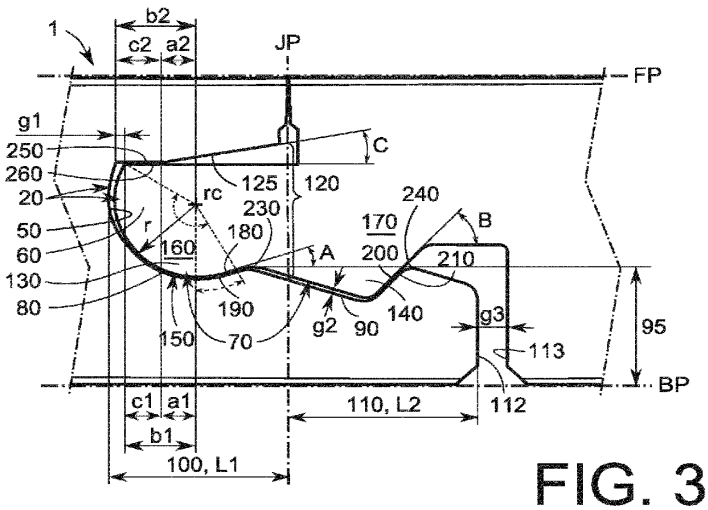


FIG. 3

(57) Abstract: The invention relates to Joining system for floor panels (1). The floor panels (1) are provided with coupling parts (20) on at least two opposite sides (30, 40) for joining floor panels (1) together. The coupling parts (20) include a groove (50) and a tongue (60), where the groove (50) is shaped for insertion of a tongue (60) on an adjoining floor panel (1). The tongue (60) is shaped for locking engagement by means of integrated locking means (70) with the groove (50) in a direction perpendicular to said sides (30, 40) and parallel to a horizontal floor plane (FP) defined by the joined panels (1). The invention is especially characterized in that: - the locking means (70) comprises dual consecutive locking recesses (80, 90) arranged in a lower portion (95) of the groove (50), a first locking recess (80) of which being located in an internally extending portion (100) within the groove (50) and a second locking recess (90) of which being located in a lip portion (110) protruding from an entrance opening (120) of the groove (50), the locking means (70) further comprises dual consecutive locking lugs (130, 140) arranged in a lower portion (150) of the tongue (60) for horizontally interlocking engagement with said dual consecutive locking recesses (80, 90) in the groove (50), a first locking lug (130) of which extending downwardly from a lower tip portion (160) of the tongue (60) and a second locking lug (140) of which extending downwardly from a root portion (170) of the tongue (60), wherein the first locking recess (80) and the first locking lug (130) are provided with

[Continued on next page]

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matching curved horizontal locking surfaces (180, 190) and wherein the second locking recess (90) and the second locking lug (140) are provided with matching inclined horizontal locking surfaces (200, 210).

JOINING SYSTEM FOR FLOOR PANELS

TECHNICAL FIELD

The present disclosure relates to joining system for floor panels. The panels have coupling parts including a groove and a tongue, wherein the tongue is inserted into the groove until the panels are joined together with coupling parts in a mutually engaged position.

BACKGROUND

Panels of the type described above and variations thereof are widely used within laminated flooring and prefabricated parquet flooring. A joining system for floor panels of the described type is known from EP 1 338 721 B1. In this joining system, a groove is shaped for insertion of a tongue on an adjoining panel. The tongue is shaped for locking engagement with the groove. The locking engagement is achieved by means of a locking element on the tongue which engages a locking recess or protrusion in a lip portion protruding from an entrance opening of the groove. The coupling parts exert a tension force towards each other in a mutually engaged position, the tension force being delivered by elastic compression of the material of the coupling parts. The joining system according to EP 1 338 721 B1 and its equivalents is a well proven and widely used design which is suitable for most practical floor coverings. The lip portion in this design is arranged to elastically deflect from the plane defined by two adjoining panels when the tongue is inserted into the groove, which allows the two joined panels to flex in relation to each other and thus deviate from the mutual plane if subjected to an external force directed perpendicularly to the individual planes of the panels. A drawback with the known locking system described in EP 1 338 721 B1 is that the elastic deflection of the lip portion required to achieve a sufficient snap-lock effect is rather significant, which causes high stress on the material in the lip portion. This stress is acceptable in dense materials, but may cause breakages in less dense materials which are used in an increasing extent on the world flooring market to save costs in large scale production of floor panels.

SUMMARY

The object of the invention is to provide a joining system for floor panels which solves the problems with prior art as described above, and to offer an improved joining system with an improved locking function and smooth insertion procedure with a minimum of stress to the material of the lip portion during the joining procedure. Hence, the invention relates to a joining system for floor panels, said floor panels being provided with coupling parts on at least two opposite sides for joining floor panels together. The coupling parts include a groove and a tongue, where the groove is shaped for insertion of a tongue on an adjoining floor panel. The tongue is shaped for locking engagement by means of integrated locking means with the groove in a direction perpendicular to said sides and parallel to a horizontal floor plane defined by the joined floor panels. The coupling parts exert a tension force towards each other in a mutually engaged position, said tension force being achieved by elastic compression of the material of the coupling parts. The invention is especially characterized in that:

- the locking means comprises dual consecutive locking recesses arranged in a lower portion of the groove, a first locking recess of which being located in an internally extending portion within the groove and a second locking recess of which being located in a lip portion (90) protruding from an entrance opening of the groove,
- the locking means further comprises dual consecutive locking lugs arranged in a lower portion of the tongue for horizontally interlocking engagement with said dual consecutive locking recesses in the groove, a first locking lug of which extending downwardly from a lower tip portion of the tongue and a second locking lug of which extending downwardly from a root portion of the tongue,
- wherein the first locking recess and the first locking lug are provided with matching curved horizontal locking surfaces and
- wherein the second locking recess and the second locking lug are provided with matching inclined horizontal locking surfaces.

In an advantageous embodiment of the invention an intermediate transitional ridge between the first locking lug and the second locking lug is located inside of an

entrance opening of the groove, said entrance opening being located in a main vertical joint plane between two joined panels.

According to an alternative beneficial embodiment of the invention, an intermediate transitional ridge between the first locking lug and the second locking lug is aligned with the entrance opening of the groove, said entrance opening being located in a main vertical joint plane between two joined panels.

In an advantageous embodiment of the invention, the tip portion of the tongue is curved. Preferably, the curvature of the curved lower tip portion of the tongue merges continuously with a corresponding curvature of the horizontal locking surface of the first locking lug.

In a beneficial embodiment of the invention, the first locking recess is shallower than the second locking recess. The depth of the first locking recess is less than half of the depth of the second locking recess.

According to a favourable embodiment of the invention, an exit tangent inclination angle of the curved horizontal locking surface of the first locking recess is less than the inclined locking angle of the second locking recess. Preferably said exit tangent inclination angle (A) is equal to or less than half the inclined locking angle of the second locking recess.

Advantageously, the curved horizontal locking surface extends from a point located essentially directly below a radial center of the curved first locking recess in a direction towards the second locking recess.

In a well-functioning embodiment of the invention, the height of the intermediate transitional ridge measured from a bottom plane of the floor panel is equal to or less than the corresponding height of a corresponding inlet ridge of the second locking recess.

In a preferred embodiment of the invention the length of a vertical locking surface of the tongue is less than the corresponding length of a matching vertical locking surface of the groove.

Preferably, the minimum thickness between the first locking recess and a bottom plane of the floor panel exceeds a third of the total height of the floor panel.

In a beneficial embodiment of the invention the introduction angle of the groove is equal to or greater than 10 degrees.

Preferably the length of the internally extending portion within the groove is less than the length of the lip portion protruding from an entrance opening of the groove.

The dual consecutive locking recesses and the matching dual consecutive locking lugs makes the mechanical locking function of the joining system stronger than known joining systems with single locking recesses and locking lugs. The dual locking horizontal function also enables the use of more shallow locking recesses which leaves room beneath the locking recesses for a thicker and more robust lower portion of the groove. This aspect is important for floor panels made of inherently brittle and less dense materials as often used in large scale serial production of floor panels.

It should be emphasized that the term *comprises/comprising* or *includes* when used in this specification is taken to specify the presence of stated features, integers, steps or components but does not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

Further advantages and advantageous features of the invention are disclosed in the following description and in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other aspects, features and advantages of which embodiments of the invention are capable of will be apparent and elucidated from the following description of embodiments of the present invention, reference being made to the accompanying drawings, in which:

Figure 1 is a broken perspective- and cross-sectional view of a typical floor panel according to a first embodiment the present invention, showing the coupling parts on each long side of the floor panel. The cross-sectional view is taken along a cross-section I-I of a floor panel shown in the following Figure 2.

Figure 2 is a simplified top view of a floor panel according to the invention, showing coupling parts on the long sides of the floor panel as well as on the short sides of a typical floor panel.

Figure 3 is an enlarged, side view of two joined floor panels of the type previously shown in Fig. 1. The figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 4 is a simplified side view of a floor panel demonstrating the profile contours of the groove according to the first embodiment of the invention as previously shown in Figs 1 and 3. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 5 is a simplified side view of a floor panel demonstrating the profile contours of the tongue according to the first embodiment of the invention as previously shown in Figs 1 and 3. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 6 is a simplified side view of two adjoining floor panels of the type previously shown in the previous figures, showing angled insertion of the tongue into the groove. An intermediate position of the tongue is drawn with dashed lines.

Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 7 is a simplified side view of two adjoining floor panels of the type previously shown in the previous figures, showing an optional straight horizontal insertion of the tongue into the groove. An intermediate position of the tongue is drawn with dashed lines as is the deflection of the lower lip portion of the groove. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 8 is a simplified side view of a floor panel demonstrating the profile contours of the tongue according to a second, optional embodiment of the invention. The figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 9 is a side view of two joined floor panels of the second embodiment as previously shown in Fig. 8. The figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 10 is a side view of two joined floor panels of a third optional embodiment of the invention.

Figure 11 is a side view of two joined floor panels of a fourth optional embodiment of the invention.

DETAILED DESCRIPTION OF EXAMPLE EMBODIMENTS OF THE INVENTION

Specific embodiments of the invention will now be described with reference to the accompanying drawings. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those

skilled in the art. The terminology used in the detailed description of the embodiments illustrated in the accompanying drawings is not intended to be limiting of the invention. In the drawings, like numbers refer to like elements.

Figure 1 is a broken perspective- and cross-sectional view of a typical floor panel 1 according to a first embodiment the present invention, showing coupling parts 20 on each long side LS of the floor panel 1. The cross-sectional view is taken along a cross-section I-I of a floor panel 1 shown in the following Figure 2. In the joining system the floor panels 1 are provided with coupling parts 20 on at least two opposite sides 30, 40 for joining floor panels 1 together. The coupling parts 20 include a groove 50 and a tongue 60, where the groove 50 is shaped for insertion of a tongue 60 on an adjoining floor panel 1.

Figure 2 is a simplified top view of a floor panel 1 according to the invention, showing coupling parts 20 on the long sides LS of the floor panel 1 as well as on the short sides SS of a typical floor panel 1.

In Figure 3 the joining system according to the invention is illustrated in an enlarged, side view of two joined floor panels 1 of the type previously shown in Fig. 1 and 2. The figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity. The tongue 60 is shaped for locking engagement by means of integrated locking means 70 with the groove 50 in a direction perpendicular to said sides 30, 40 and parallel to a horizontal floor plane FP defined by the joined panels 1, as shown in Fig. 3. The coupling parts 20 exert a tension force towards each other in a mutually engaged position, the tension force being achieved by elastic compression of the material of the coupling parts 20. Unique features of the invention include:

- the locking means 70 comprises dual consecutive locking recesses 80, 90 arranged in a lower portion of the groove 50, a first locking recess 80 of which being located in an internally extending portion 100 within the groove 50 and a second locking recess 90 of which being located in a lip portion 110 protruding from an entrance opening 120 of the groove 50,

- the locking means 70 further comprises dual consecutive locking lugs 130, 140 arranged in a lower portion 150 of the tongue 60 for horizontally interlocking engagement with said dual consecutive locking recesses 80, 90 in the groove 50, a first locking lug 130 of which extending downwardly from a lower tip portion 160 of the tongue 60 and a second locking lug 140 of which extending downwardly from a root portion 170 of the tongue 60,
- wherein the first locking recess 80 and the first locking lug 130 are provided with matching curved horizontal locking surfaces 180, 190 and
- wherein the second locking recess 90 and the second locking lug 140 are provided with matching inclined horizontal locking surfaces 200, 210.

The dual consecutive locking recesses 80, 90 and the matching dual consecutive locking lugs 130, 140 makes the mechanical locking function of the joining system stronger than known joining systems with single locking recesses and locking lugs. The dual locking horizontal function also enables the use of more shallow locking recesses which leaves room beneath the locking recesses for a thicker and more robust lower portion 95 of the groove 50. This aspect is important for floor panels 1 made of inherently brittle and less dense materials as often used in large scale serial production of floor panels.

The extension of the matching curved horizontal locking surfaces 180, 190 of the first locking recess 80 and the first locking lug 130 is illustrated in Fig. 3 as a sector drawn with dashed lines as well as a dashed sector angle arrow below the actual horizontal locking surfaces 180, 190. By the term horizontal locking surfaces is here meant locking surfaces intended to lock the floor panels 1 together in a horizontal direction, i.e. the direction of the floor plane FP and the parallel bottom plane BP as indicated in the figure. Thus, the horizontal locking surfaces 180, 190 are not horizontal per se, but instead exhibit the curved shape shown in the figures.

As is further shown in Fig. 3, an intermediate transitional ridge 230 is located between the first locking lug 130 and the second locking lug 140 inside of the entrance opening 120 of the groove 50. As illustrated in the figure, the entrance

opening 120 is more particularly located in a main vertical joint plane JP between two joined floor panels 1.

An important feature of the invention is that the lower tip portion 160 of the tongue 60 is curved, which greatly facilitates insertion of the tongue 60 into the groove 50. The curvature of the curved lower tip portion 160 merges continuously with a corresponding curvature of the horizontal locking surface 190 of the first locking lug 130.

In order to ensure an easy access for the tongue during the joining procedure, the introduction angle C of the groove 50 is equal to or greater than 10 degrees. Said introduction angle C is defined as the inclination of an inclined introduction guiding chamfer 125, as illustrated in Fig. 3.

As demonstrated in Fig. 3, an exit tangent inclination angle A of the curved horizontal locking surface 180 of the first locking recess 80 is less than the inclined locking angle B of the second locking recess 90. Preferably, the exit tangent inclination angle A is equal to or less than half the inclined locking angle B of the second locking recess 90.

The curved horizontal locking surface 180 extends from a point located essentially directly below a radial center rc of the curved first locking recess 80 in a direction towards the second locking recess 90.

In Fig. 3, tolerance gaps g1, g2 and g3 facilitate production of the joining system. Tolerance gap g1 is formed between the tip of the tongue 60 and the groove 50. Tolerance gap g2 is formed between the second locking recess 90 and the second locking lug 140 on the left side - as shown in Fig. 3 - of the matching inclined locking surfaces 200, 210. Finally, a tolerance gap g3 is formed between a distal end surface 112 of the lip portion 110 of the left floor panel 1 in Fig. 3 and an adjacent lower end surface 113 of the adjoining floor panel 1 shown to the right in Fig. 3.

As further demonstrated in Fig. 3, the length L1 of the internally extending portion 100 within the groove 50 is less than the length L2 of the lip portion 110 protruding from an entrance opening 120 of the groove 50. This feature ensures a robust joining system with improved strength compared to joining systems where the groove 50 is deeper and the tongue is longer than in the proposed joining system.

The length c1 of a vertical locking surface 250 of the tongue 60 is less than the corresponding length c2 of a matching vertical locking surface 260 of the groove 50. This relationship is demonstrated by the dimensions a1, b1, c1 and a2, b2, c2 illustrated with dimension arrows in Fig. 3. Hence c1=b1-a1 < c2=b2-a2.

Figure 4 is a simplified side view of a floor panel demonstrating the profile contours of the groove according to the first embodiment of the invention as previously shown in Figs 1 and 3. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity. As shown in the figure, the first locking recess 80 is shallower than the second locking recess 90. In the shown embodiment, the depth d of the first locking recess 90 is less than half of the depth D of the second locking recess 90. Furthermore, the height h1 of the intermediate transitional ridge 230 measured from a bottom plane BP of the floor panel 1 is equal to or less than the corresponding height h2 of a corresponding inlet ridge 240 of the second locking recess 90. The minimum thickness t between the first locking recess 80 and a bottom plane BP of the of the floor panel 1 exceeds a third of the total height H of the floor panel 1.

Figure 5 is a simplified side view of a floor panel demonstrating the profile contours of the tongue 60 according to the first embodiment of the invention as previously shown in the preceding figures 1 – 4. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figure 6 is a simplified side view of two adjoining floor panels 1 of the type previously shown in the previous figures, showing angled insertion of the tongue 60 into the groove 50, as indicated with the curved arrow 55. An intermediate position of the tongue is drawn with dashed lines. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity. The angled insertion is greatly facilitated by the smooth gradual engagement of the curvature of the rounded lower tip portion 160 of the tongue 60, resulting in little or no deflection of the lower lip portion 95 of the groove 50.

Figure 7 is a simplified side view of two adjoining floor panels of the type previously shown in the previous figures, showing an optional straight horizontal insertion of the tongue 60 into the groove 50, as indicated with the curved arrow 65. An intermediate position of the tongue is drawn with dashed lines as is the deflection of the lower lip portion 95 of the groove 50. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity. The straight horizontal insertion requires a higher insertion force when joining the floor panels 1 and results in a marked deflection of the lower lip portion 95 of the groove 50, as indicated by the dashed lines.

Figure 8 is a simplified side view of a floor panel 1 demonstrating the profile contours of the tongue 60 according to a second, optional embodiment of the invention. The figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity. In this embodiment, the intermediate transitional ridge 230 between the first locking recess 80 and the second locking recess 90 is aligned with the entrance opening 120 of the groove 50.

Figure 9 is a side view of two joined floor panels 1 of the second embodiment as previously shown in Fig. 8. The figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity.

Figures 10 and 11 are side views of two joined floor panels of a third and fourth optional embodiment of the invention. Again, the figures are drawn with

emphasized contour lines and without cross-sectional markings for the sake of clarity. The embodiments shown in Figures 10 and 11 are compatible with the other embodiments of this disclosure, and most features and functions are shared with the other embodiments. The following description will thus focus on the differing features. In the embodiments shown in Figures 10 and 11, the groove 50 comprises a stepped inclined introduction guiding chamfer, forming a first inclined introduction guiding chamfer 125a and a second inclined introduction chamfer 125b. The second inclined introduction guiding chamfer 125b is arranged closer to the vertical joint plane JP and is steeper, i.e. closer to a vertical angle, than the inclined introduction guiding chamfer 125a that is arranged further into the groove 50. The stepped inclined introduction chamfers 125a, 125b facilitates assembly of the floor panels. Furthermore, it is beneficial in terms of manufacturing as tool access is improved. The vertical locking surface 260 of the groove 50 is arranged inside of and adjacent to the first inclined guiding chamfer 125a in the groove 50.

The upper side of the tongue 60 may be concavely shaped, as shown in Figures 10 and 11, with a recess 270 having at least it deepest portion arranged at a lower vertical position than that of the vertical locking surface 250 on the tongue 60. Preferably is the curvature of the upper side of the tongue 60 arranged such that is merges smoothly and transitions from the concave recess 270 to the convex vertical locking surface 260. The rounded, convex shape of the vertical locking surface 250 in turn preferably merges into the curvature of the first locking lug 130. Preferably is the deepest portion of the recess arranged on the tongue 60 such that it will be located inside of the joint plane JP in the groove 50 when the floor panels 1 are connected to each other. The rounded convex shape of the vertical locking surface 250 provides a resilient locking at least partly attributed to the deformation of the vertical locking surface 250 by the contact forces between the tongue 60 and the groove 50. The vertical locking surface 250 on the tongue 60 will be at least elastically deformed upon assembly by its contact with the vertical locking surface 260 in the groove 50, improving the locking of the floor panels and reducing the risk of gaps forming and/or sounds such as squeaking being emitted due to movement between the floor panels. The rounded convex shape of the

vertical locking surface 250 is also beneficial in terms of manufacturing tolerance uptake, as it allows elasticity in the material to absorb tolerances better than a flat shape. The recess 270 further improves the elasticity or resilience in the tongue 60 as a whole, allowing the tongue 60 to provide an improved tension or preload to the joint between the floor panels 1. The recess 270 further facilitates insertion of the tongue 60 into the groove 50.

As is illustrated in the embodiments of Fig. 10 and Fig. 11, the elasticity of the joint between the floor panels can be controlled by adjusting the depth of the groove 60 (i.e. the length L1 of the internally extending portion 100) and the corresponding protrusion of the tongue 50. The embodiment shown in Fig. 11 comprises a more shallow groove 60 and a shorter tongue 50 than that of Fig. 10, and is thus more rigid given that materials of the floor panels 1 etc. are the same. The shallower groove 60 is beneficial in that the lever arm effect of a vertical force applied above the groove 60 and close to the joint plane JP (to the left of the joint plane JP in Fig. 11) will be less significant, compared to that of Fig. 10. I.e., the embodiment shown in Fig. 11 may be beneficial for applications where the joints between the floor panels 1 may be subjected to high loads, as higher loads can be tolerated without risking that the joints between the floor panels 1 become vertically offset due to deformation and thus subjected to increased wear.

In addition, the embodiment shown in Fig. 11 may comprise a first 280 and second contact surface 290 arranged on opposite sides 30, 40 of the floor panel 1, the first and second contact surfaces 280, 290 being arranged to come into contact with each other when the floor panels 1 are assembled and form additional horizontal locking surfaces. The first and second contact surfaces 280, 290 are preferably vertically oriented and parallel to each other such that forces in the joint between the floor panels 1 are distributed over a larger surface area.

Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. It will be further understood that terms,

such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

It is to be understood that the present invention is not limited to the embodiments described above and illustrated in the drawings and a skilled person will recognize that many changes and modifications may be made within the scope of the appended claims.

CLAIMS

1. Joining system for floor panels (1), said floor panels (1) being provided with coupling parts (20) on at least two opposite sides (30, 40) for joining floor panels (1) together, said coupling parts (20) including a groove (50) and a tongue (60), where the groove (50) is shaped for insertion of a tongue (60) on an adjoining floor panel (1), said tongue (60) being shaped for locking engagement by means of integrated locking means (70) with the groove (50) in a direction perpendicular to said sides (30, 40) and parallel to a horizontal floor plane (FP) defined by the joined panels (1), said coupling parts (20) exerting a tension force towards each other in a mutually engaged position, the tension force being achieved by elastic compression of the material of the coupling parts (20), **characterized in** that

- the locking means (70) comprises dual consecutive locking recesses (80, 90) arranged in a lower portion (95) of the groove (50), a first locking recess (80) of which being located in an internally extending portion (100) within the groove (50) and a second locking recess (90) of which being located in a lip portion (110) protruding from an entrance opening (120) of the groove (50),
- the locking means (70) further comprises dual consecutive locking lugs (130, 140) arranged in a lower portion (150) of the tongue (60) for horizontally interlocking engagement with said dual consecutive locking recesses (80, 90) in the groove (50), a first locking lug (130) of which extending downwardly from a lower tip portion (160) of the tongue (60) and a second locking lug (140) of which extending downwardly from a root portion (170) of the tongue (60),
- wherein the first locking recess (80) and the first locking lug (130) are provided with matching curved horizontal locking surfaces (180, 190) and
- wherein the second locking recess (90) and the second locking lug (140) are provided with matching inclined horizontal locking surfaces (200, 210).

2. Joining system for floor panels (1) according to claim1, **characterized in** that an intermediate transitional ridge (230) between the first locking lug (130) and the second locking lug (140) is located inside of the entrance opening (120) of the

groove (50), said entrance opening (120) being located in a main vertical joint plane (JP) between two joined floor panels (1).

3. Joining system for floor panels (1) according to claim 1, **characterized in** that an intermediate transitional ridge (230) between the first locking lug (130) and the second locking lug (140) is aligned with the entrance opening (120) of the groove (50), said entrance opening (120) being located in a main vertical joint plane (JP) between two joined panels (1).

4. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that the lower tip portion (160) of the tongue (60) is curved.

5. Joining system for floor panels (1) according to claim 4, **characterized in** that the curvature of the curved lower tip portion (160) of the tongue (60) merges continuously with a corresponding curvature of the horizontal locking surface (190) of the first locking lug (130).

6. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that the first locking recess (80) is shallower than the second locking recess (90).

7. Joining system for floor panels (1) according to any of the preceding claims 1 through 5, **characterized in** that the depth (d) of the first locking recess (90) is less than half of the depth (D) of the second locking recess (90).

8. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that an exit tangent inclination angle (A) of the curved horizontal locking surface (180) of the first locking recess (80) is less than the inclined locking angle (B) of the second locking recess (90).

9. Joining system for floor panels (1) according to claim 8, **characterized in** that said exit tangent inclination angle (A) of the curved horizontal locking surface (180)

of the first locking recess (80) is equal to or less than half the inclined locking angle (B) of the second locking recess (90).

10. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that the curved horizontal locking surface (180) extends from a point located essentially directly below a radial center (rc) of the curved first locking recess (80) in a direction towards the second locking recess (90).

11. Joining system for floor panels (1) according to any of the preceding claims 3 through 10, **characterized in** that the height (h1) of the intermediate transitional ridge (230) measured from a bottom plane (BP) of the floor panel (1) is equal to or less than the corresponding height (h2) of a corresponding inlet ridge (240) of the second locking recess (90).

12. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that the length (c1) of a vertical locking surface (250) of the tongue (60) is less than the corresponding length (c2) of a matching vertical locking surface (260) of the groove (50).

13. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that the minimum thickness (t) between the first locking recess (80) and a bottom plane (BP) of the of the floor panel (1) exceeds a third of the total height (H) of the floor panel (1).

14. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that the introduction angle (C) of the groove (50) is equal to or greater than 10 degrees.

15. Joining system for floor panels (1) according to any of the preceding claims, **characterized in** that the length (L1) of the internally extending portion (100) within the groove (50) is less than the length (L2) of the lip portion (110) protruding from an entrance opening (120) of the groove (50).

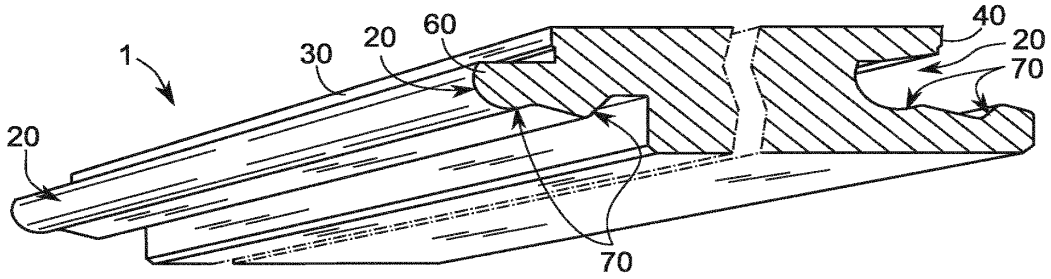


FIG. 1

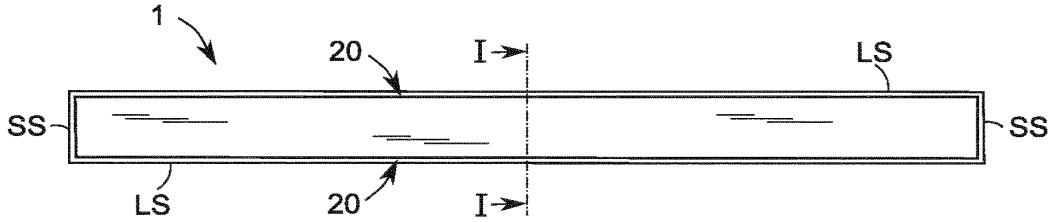


FIG. 2

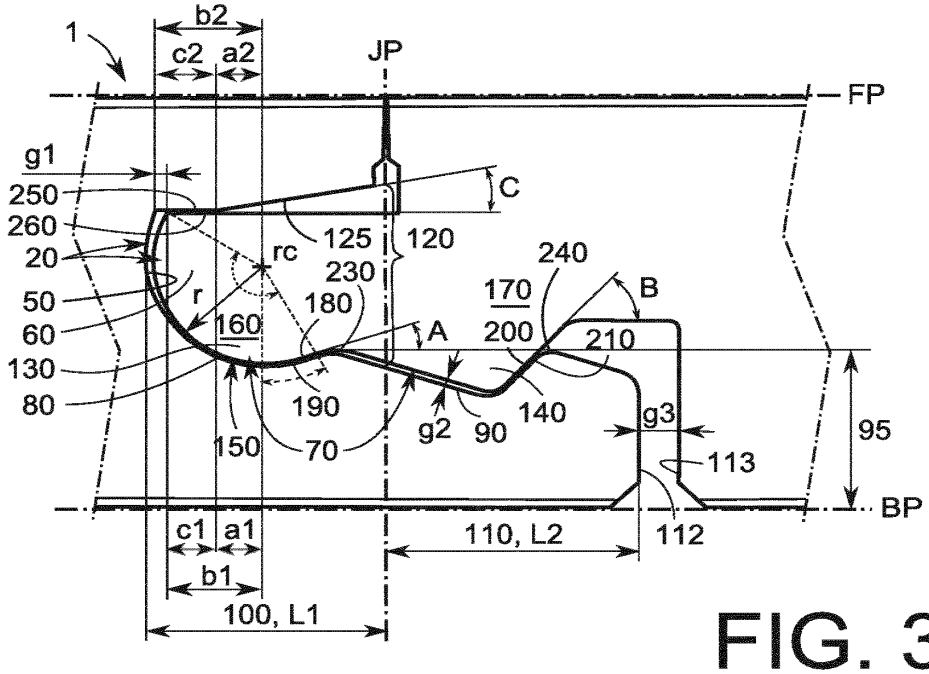


FIG. 3

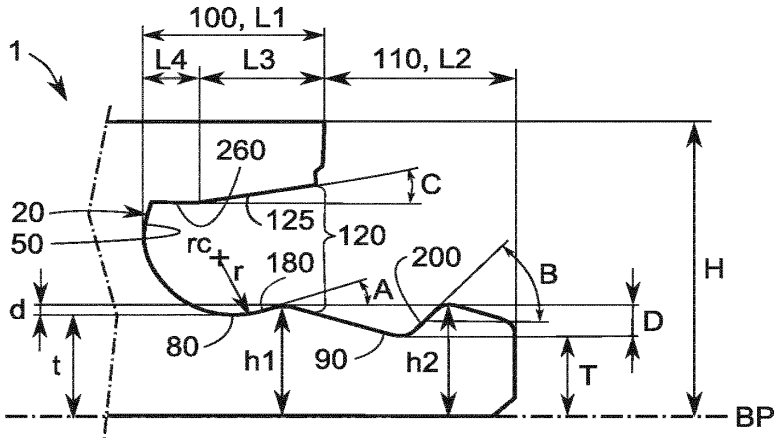

100, L1
L4
L3
110, L2
1
260
C
20
50
125
120
rc
r
180
200
B
H
A
d
D
80
h1
90
h2
T
t
BP

FIG. 4

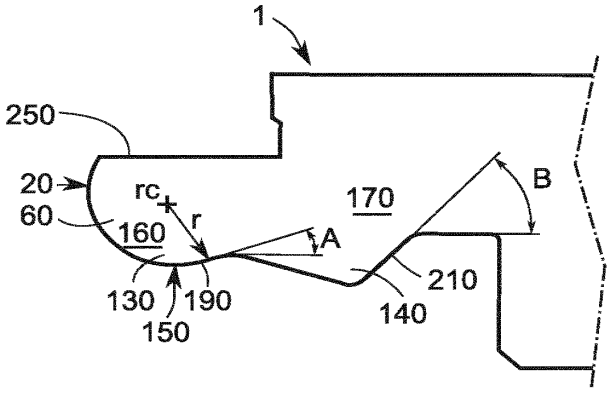

1
250
20
rc
r
170
B
60
160
A
210
130
190
140
150

FIG. 5

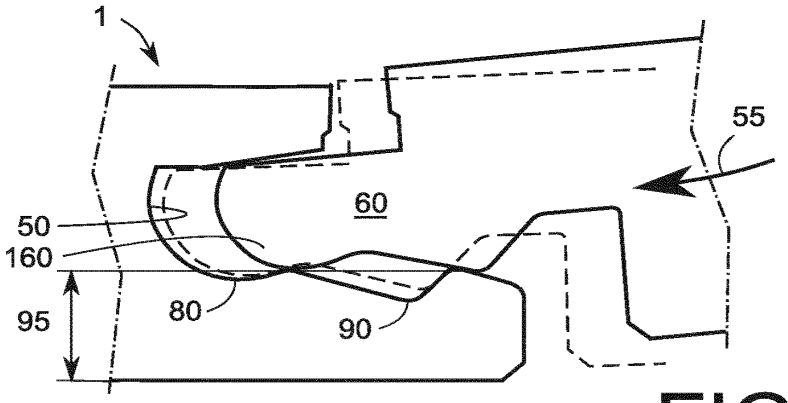


FIG. 6

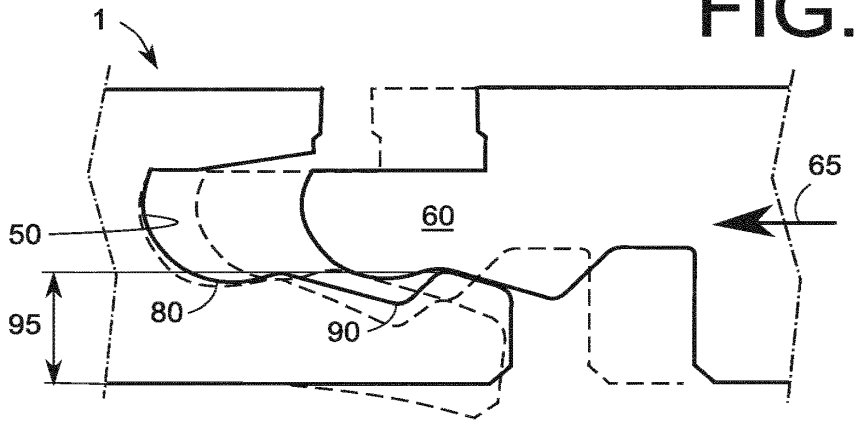


FIG. 7

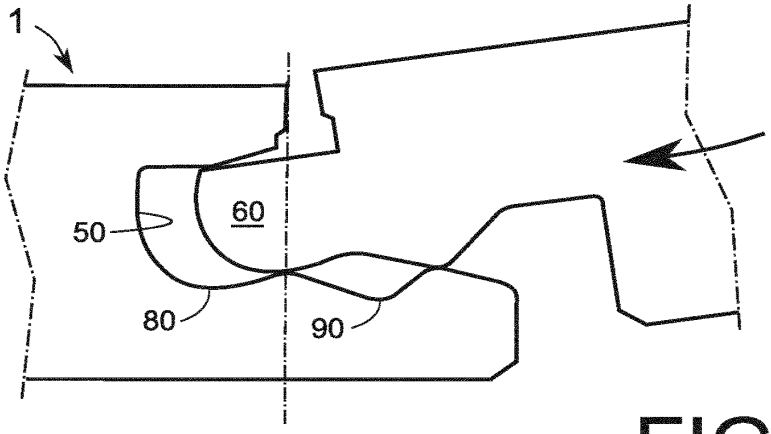


FIG. 8

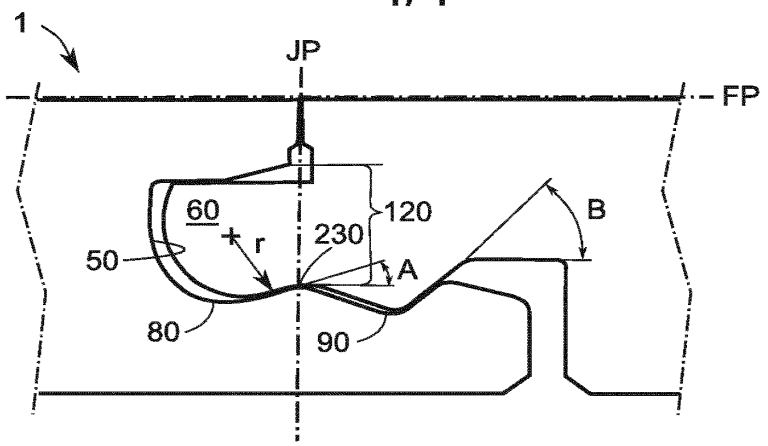


FIG. 9

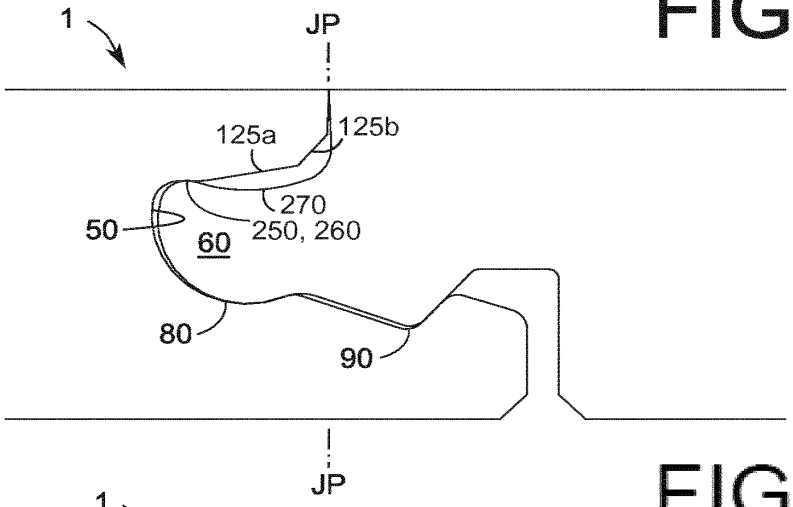


FIG. 10

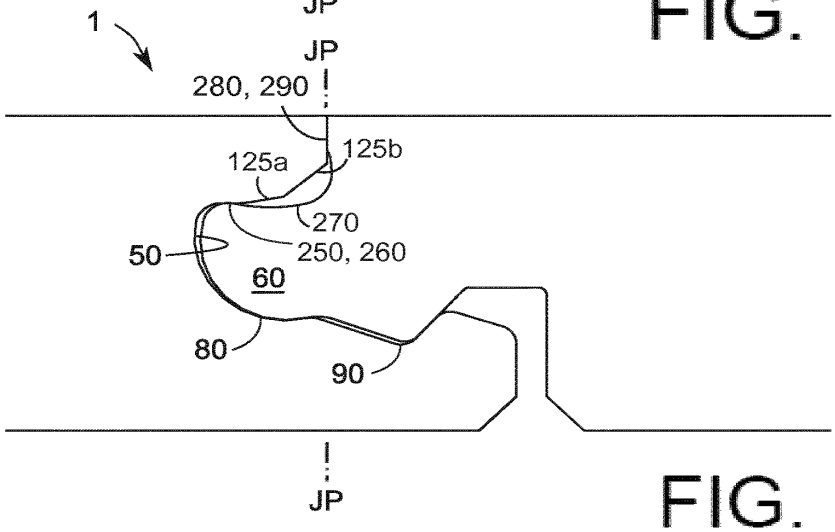


FIG. 11

PTO-1390 (10-20)
Approved for use through 10/31/2022. OMB 0651-0021
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A SUBMISSION UNDER 35 U.S.C. 371

Attorney Docket No.	U.S. Application No. (if known, see 37 CFR 1.5)
A676-3	To Be Assigned

International Application No.	International Filing Date	Priority Date Claimed
PCT/EP2019/061431	May 3, 2019	May 4, 2018

Title of Invention
JOINING SYSTEM FOR FLOOR PANELS

First Named Inventor
Bobby Markovski et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information.

1. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). NOTE: The express request under 35 U.S.C. 371(f) will not be effective unless the requirements under 35 U.S.C. 371(c)(1), (2), and (4) for payment of the basic national fee, copy of the International Application and English translation thereof (if required), and the oath or declaration of the inventor(s) have been received.
2. ☒ A copy of the International Application (35 U.S.C. 371(c)(2)) is attached hereto (not required if the International Application was previously communicated by the International Bureau or was filed in the United States Receiving Office (RO/US)).
3. An English language translation of the International Application (35 U.S.C. 371(c)(2))
   a. ☐ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
4. An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4))
   a. ☐ is attached.
   b. ☐ was previously filed in the international phase under PCT Rule 4.17(iv).

Items 5 to 8 below concern amendments made in the international phase.

PCT Article 19 and 34 amendments

5. ☐ Amendments to the claims under PCT Article 19 are attached (not required if communicated by the International Bureau) (35 U.S.C. 371(c)(3)).
6. ☐ English translation of the PCT Article 19 amendment is attached (35 U.S.C. 371(c)(3)).
7. ☐ English translation of annexes (Article 19 and/or 34 amendments only) of the International Preliminary Examination Report is attached (35 U.S.C. 371(c)(5)).

Cancellation of amendments made in the international phase

8a. ☐ Do not enter the amendment made in the international phase under PCT Article 19.

8b. ☐ Do not enter the amendment made in the international phase under PCT Article 34.

NOTE: A proper amendment made in English under Article 19 or 34 will be entered in the U.S. national phase application absent a clear instruction from applicant not to enter the amendment(s).

The following items 9 to 17 concern a document(s) or information included.

9. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
10. ☒ A preliminary amendment.
11. ☒ An Application Data Sheet under 37 CFR 1.76.
12. ☐ A substitute specification. NOTE: A substitute specification cannot include claims. See 37 CFR 1.125(b).
13. ☐ A power of attorney and/or change of address letter.
14. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13*ter*.3 and 37 CFR 1.821-1.825 (not required if sequence listing in text format was indicated on the PCT Request as part of the International Application and the sequence listing was published as part of the international application).
15. ☐ Assignment papers *(cover sheet and document(s))*. Name of Assignee: _____
16. ☐ 37 CFR 3.73(c) Statement *(when there is an Assignee)*.

This collection of information is required by 37 CFR 1.414 and 1.491-1.492. The information is required to obtain or retain a benefit by the public, which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 15 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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U.S. APPLN. No. (if known – see 37 CFR 1.5)	INTERNATIONAL APPLICATION No.	ATTORNEY DOCKET No.
To Be Assigned	PCT/EP2019/061431	A676-3

17. ☒ Other items or information:

PCT/IB/306 (Notification of the Recording of a Change)

The following fees have been submitted.	CALCULATIONS
18. ☒ Basic national fee (37 CFR 1.492(a)) **$320**	$ 160.
19. ☒ Examination fee (37 CFR 1.492(c)) • If the written opinion prepared by ISA/US or the international preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4)..... **$0** • All other situations **$800**	$ 400.
20. ☒ Search fee (37 CFR 1.492(b)) • If the written opinion prepared by ISA/US or the international preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4)..... **$0** • Search fee (37 CFR 1.445(a)(2)) has been paid on the international application to the USPTO as an International Searching Authority ..... **$140** • International Search Report prepared by an ISA other than the US and provided to the Office or previously communicated to the US by the IB..... **$540** • All other situations **$700**	$ 270.
TOTAL OF 18, 19, and 20 =	$ 830.
☐ Additional fee for specification and drawings filed in paper over 100 sheets (excluding sequence listing in compliance with 37 CFR 1.821(c) or (e) in an electronic medium or computer program listing in an electronic medium) (37 CFR 1.492(j)). Fee for each additional 50 sheets of paper or fraction thereof **$420**	$

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof (round **up** to a whole number)	RATE
23 - 100 =	/ 50 =		x **$420**

Surcharge for furnishing any of the search fee, examination fee, or the oath or declaration after the date of commencement of the national stage (37 CFR 1.492(h)) **$160**	$ 80.

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	15 - 20 =		x **$100**	$
Independent claims	1 - 3 =		x **$480**	$
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ **$860**	$

Fee for submission of Sequence Listing text file of 300 MB to 800 MB (37 CFR 1.21(o)(1)) **$1,060**	$
Fee for submission of Sequence Listing text file of more than 800 MB (37 CFR 1.21(o)(2)) **$10,500**	$
Processing fee for furnishing the English translation later than 30 months from the earliest claimed priority date (37 CFR 1.492(i)) ..... **$140** +	$
TOTAL OF ABOVE CALCULATIONS =	$ 910.
☒ **Applicant asserts small entity status.** See 37 CFR 1.27. Fees above are reduced by ½.	
☐ **Applicant certifies micro entity status.** See 37 CFR 1.29. Fees above are reduced by ¾. Applicant must attach form PTO/SB/15A or B or equivalent.	
TOTAL NATIONAL FEE =	$ 910.
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) ..... **$50.00** per property +	$
TOTAL FEES ENCLOSED =	$ 910.

a. ☐ A check in the amount of $_____ to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of $_____ to cover the above fees.

c. ☒ The Director is hereby authorized to charge additional fees which may be required, or credit any overpayment, to Deposit Account No. 50-0320 as follows:

i. ☒ any required fee.

ii. ☐ any required fee except for excess claims fees required under 37 CFR 1.492(d) and (e) and multiple dependent claim fee required under 37 CFR 1.492(f).

d. ☒ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038. The PTO-2038 should only be mailed or faxed to the USPTO. However, when paying the basic national fee, the PTO-2038 may NOT be faxed to the USPTO.

ADVISORY: If filing by EFS-Web, do **NOT** attach the PTO-2038 form as a PDF along with your EFS-Web submission. Please be advised that this is **not** recommended and by doing so your **credit card information may be displayed via PAIR**. To protect your information, it is recommended to pay fees online by using the electronic payment method.

NOTE: Where an appropriate time limit under 37 CFR 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the International Application to pending status.

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013, and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.

NOTE 1: By providing this statement under 37 CFR 1.55 or 1.78, **this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA**.

NOTE 2: A U.S. national stage application may not claim priority to the international application of which it is the national phase. The filing date of a U.S. national stage application is the international filing date. See 35 U.S.C. 363.

Correspondence Address

☒ The address associated with Customer Number: 20999 **OR** ☐ Correspondence address below

Name					
Address					
City		State		Zip Code	
Country		Telephone			
Email					

Signature	/David V. Rossi/	Date	November 4, 2020
Name (Print/Type)	David V. Rossi	Registration No. (Attorney/Agent)	36,659

PATENT
Attorney Docket No. A676-3

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	VILOX AB
First Named Inventor:	Bobby Markovski et al.
Serial No.:	To Be Assigned
International Application No.:	PCT/EP2019/061431
International Filing Date:	May 3, 2019
For:	JOINING SYSTEM FOR FLOOR PANELS

INFORMATION DISCLOSURE STATEMENT

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

Sir:

Applicant is filing this Information Disclosure Statement (IDS), including an Information Disclosure Citation List (Form PTO/SB/08a and 08b) along with copies of any therein-cited documents other than US patents and US patent application publications, to disclose references cited in the International Search Report of corresponding International Application No. PCT/EP2019/061431, of which the present application is a National Stage entry under 35 U.S.C. § 371.

Entry of this Information Disclosure Statement and an early examination on the merits are respectfully solicited.

General Authorization: No fee is believed to be due, however, the Commissioner is authorized to charge any fee deficiencies, and credit any overpayment, during the entire pendency of this application to Deposit Account 50 0320.

Date: November 4, 2020

Respectfully submitted,

/David V. Rossi/
David V. Rossi, Reg. No. 36,659

Attorney for Applicant
Tel. No.: (212) 588-0800
Fax No.: (212) 588-0500

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