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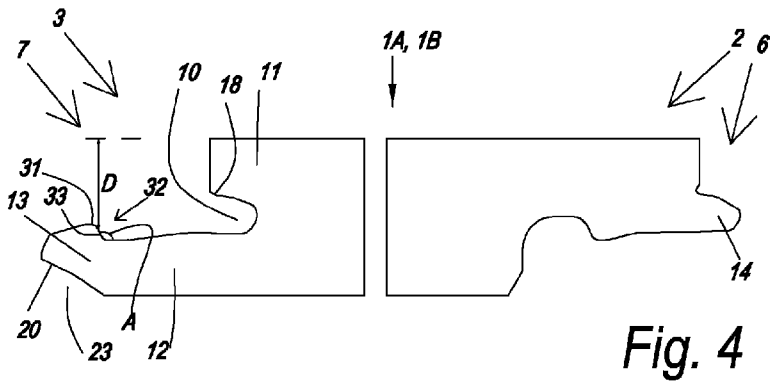

Fig. 4

(57) Abstract: Set of floor panels, wherein these floor panels (1A-1B) are elongate rectangular and therefore comprise a pair of long edges (2-3) and a pair of short edges (4-5); and wherein both the long and the short edges are provided with mechanical coupling parts (6-7-8-9) which allow the floor panels to be coupled together in such a way that a herringbone pattern may be produced thereby.

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Set of floor panels and method for installing this set of floor panels

The present invention relates to a set of floor panels which is suitable for forming a floor covering, and to a method for installing this set of floor panels. More particularly, it relates to a set of floor panels which are provided with well-defined coupling parts on their edges.

The set may be composed of floor panels which, according to a first possibility, are all the same or similar with regard to the coupling parts on the edges thereof, and which, according to a second possibility, consist of floor panels which include two or more types per set with regard to the configuration of the coupling parts, a typical example being floor panels which comprise two types, so that they can be laid in a herringbone pattern, in which case the distribution of male and female coupling parts along the periphery of the floor panels for the two types of floor panels then differs, more particularly is mutually mirrored.

The floor panels are preferably elongate rectangular and therefore comprise a pair of long edges and a pair of short edges. Both the long and the short edges are provided with mechanical coupling parts which allow the floor panels to be coupled together.

Preferably, the coupling parts on all four edges are integrally formed from the material of the floor panel, preferably by means of a machine operation, for example a milling process. The expression “integrally formed from the material of the floor panel” is understood to mean that no essential separate parts, such as interlocking strips or the like, still have to be provided on the already machine-processed edges during production. However, this does not rule out that this may be a floor panel whose substrate has an edge portion which consists of a material which differs from the material which is mainly used in the floor panel, wherein the integrally formed coupling part is then entirely or partly formed in this edge portion. This may be the case, as is known, with the so-called “engineered wood” panels.

The type of sets of floor panels as referred to in the present invention are known, inter alia, from WO2017/187298 and from WO2019/138365A1.

It is first and foremost the objective of the present invention an alternative set of floor panels which, at least in a specific embodiment thereof, is suitable to form a floor covering in a herringbone pattern. In particular, it is an object of the invention to provide floor panels which can easily be laid in a herringbone pattern, wherein these panels can be coupled together securely in such a way that the risk of differences in height, formation of gaps or cracks between the mutually coupled floor panels can be minimized.

The invention provides various independent aspects which fulfill the intended objectives.

The first aspect of the invention is a set of floor panels, wherein these floor panels are elongate rectangular and therefore comprise a pair of long edges and a pair of short edges; wherein both the long and the short edges are provided with mechanical coupling parts which allow the floor panels from the set to be coupled together; wherein the one long edge is provided with a male coupling part and the other long edge is provided with a female coupling part; wherein the one short edge is provided with a male coupling part and the other short edge is provided with a female coupling part; wherein the male coupling part on the long edge can be fitted into the female coupling part on the long edge of a floor panel of the set by means of a rotating movement; wherein the male coupling part on the long edge can also be fitted into the female coupling part on the short edge of a floor panel from the set by means of a rotating movement; and wherein the male coupling part on the short edge can be fitted into the female coupling part on the long edge in one and the same rotating movement which is used to fit the male coupling part on the long edge into the female coupling part on the long or short edge; wherein the male coupling part on the short edge and the female coupling part on the long edge comprise interlocking parts which, in a mutually coupled position of such a short edge and long edge, bring about an interlocking in a horizontal direction and an interlocking in a vertical direction; wherein the female coupling part on the long edge and on the short edge comprises a lateral groove which is delimited by an upper lip and a bottom lip, the bottom lip of which extends distally beyond the upper lip and is provided

with an upwardly pointing interlocking part; wherein the male coupling part on the long edge is provided with a tongue which, in the coupled position, can cooperate with the abovementioned lateral groove in order to bring about a vertical interlocking; and wherein the set of floor panels comprises at least one pair of interlocking portions in order to bring about the abovementioned vertical interlocking of the male coupling part on the short edge into the female coupling part on the long edge, characterized in that the male coupling part on the long edge may be fitted into the female coupling part on the short edge of a floor panel from the set by means of a horizontal sliding movement with snap-fit effect; preferably wherein the male coupling part on the long edge may be fitted into the female coupling part on the long edge of a floor panel of the set by means of a horizontal sliding movement with snap-fit effect.

The panels can be installed by means of the so-called “fold down” method. Due to the fact that the set of panels of the first aspect of the invention may also be coupled together by means of a horizontal sliding movement, the ease of installation increases, in particular along the edges of the room in which the panels are being laid, for example in a herringbone pattern. Furthermore, the first aspect of the invention also makes it easier to lay panels in a herringbone pattern from the center of a room, since, with the “fold-down” method, panels can only be used efficiently in one direction. The invention makes it possible to couple the panels together in the other direction by means of a horizontal sliding movement with snap-fit effect. This is explained further in Fig. 3 which illustrates the “fold-down” method as used when installing panels in one direction; and Fig. 11 shows the installation of panels in the other direction by means of the sliding effect with snap-fit effect.

A preferred embodiment of the first aspect of the invention is characterized in that the male coupling part on the long edge and the female coupling part on the short edge are configured in such a way that when horizontally sliding a first panel from the set of floor panels with respect to a second panel from the set of floor panels in order to couple the male coupling part on the long edge of the first panel to the female coupling part on the short edge of the second panel, when sliding the bottom side of the tongue of the male coupling part on the long edge over the upwardly pointing interlocking part of the female

coupling part on the short edge, the tongue of the male coupling part on the long edge is guided in the groove of the female coupling part on the short edge.

A preferred embodiment of the first aspect of the invention is characterized in that the male coupling part on the long edge and the female coupling part on the short edge are configured such that, when horizontally sliding a first panel from the set of floor panels with respect to a second panel from the set of floor panels to couple the male coupling part on the long edge of the first panel to the female coupling part on the short edge of the second panel, when sliding the bottom side of the tongue of the male coupling part on the long edge over the upwardly pointing interlocking part of the female coupling part on the short edge, the tongue of the male coupling part on the long edge is guided in the groove of the female coupling part on the short edge, wherein no deformation of the tongue of the male coupling part on the long edge and no deformation of the bottom lip of the female coupling part on the short edge is required in order to insert this tongue into this groove.

A preferred embodiment of the first aspect of the invention is characterized in that, when coupling the male coupling part on the long edge of a panel from the set by means of a horizontal sliding movement with snap-fit effect into the female coupling part on the short edge of a floor panel, a bending and returning of the bottom lip of the female coupling part on the short edge takes place.

The second aspect of the invention relates to a set of floor panels, optionally as in any embodiment of the first aspect of the invention, wherein these floor panels are elongate rectangular and therefore comprise a pair of long edges and a pair of short edges; wherein both the long and the short edges are provided with mechanical coupling parts which allow the floor panels from the set to be coupled together; wherein the one long edge is provided with a male coupling part and the other long edge is provided with a female coupling part; wherein the one short edge is provided with a male coupling part and the other short edge is provided with a female coupling part; wherein the male coupling part on the long edge can be fitted into the female coupling part on the long edge of a floor panel of the set by means of a rotating movement; wherein the male coupling part on the

long edge can also be fitted into the female coupling part on the short edge of a floor panel from the set by means of a rotating movement; and wherein the male coupling part on the short edge can be fitted into the female coupling part on the long edge in one and the same rotating movement which is used to fit the male coupling part on the long edge into the female coupling part on the long or short edge; wherein the male coupling part on the short edge and the female coupling part on the long edge have interlocking parts which, in a mutually coupled position of such a short edge and long edge, bring about an interlocking in a horizontal direction and an interlocking in a vertical direction; wherein the female coupling part on the long edge and on the short edge comprises a lateral groove which is delimited by an upper lip and a bottom lip, the bottom lip of which extends distally beyond the upper lip and is provided with an upwardly pointing interlocking part; wherein the male coupling part on the long edge is provided with a tongue which, in the coupled position, can cooperate with the abovementioned lateral groove in order to bring about a vertical interlocking; and wherein the set of floor panels comprises at least one pair of interlocking portions in order to bring about the abovementioned vertical interlocking of the male coupling part on the short edge into the female coupling part on the long edge, characterized in that the upwardly pointing interlocking part of the female coupling part on the long edge and/or the upwardly pointing interlocking part of the female coupling part on the short edge, in cross section at right angles to the respective edge, comprises a point which is situated closest to the top side of the panel, and wherein, when running through the section of this interlocking part proximally from this point, from proximally from this interlocking part to the distal end of this interlocking part, the distance to the level of the surface of the floor panel becomes continuously smaller.

The feature that the upwardly pointing interlocking part of the female coupling part on the long edge and/or the upwardly pointing interlocking part of the female coupling part on the short edge, in cross section at right angles to the respective edge, comprises a point which is situated closest to the top side of the panel, and wherein, when running through the section of this interlocking part proximally from this point, from proximally from this interlocking part to the distal end of this interlocking part, the distance to the level of the surface of the floor panel becomes continuously smaller, has surprising advantages. The

milling process is simplified, resulting in smaller tolerances. Consequently, the coupling is made more secure, both in terms of the ease of coupling and of the correct coupling of the panels to each other. In addition, the same face may be provided proximally on the upwardly pointing interlocking part of the female coupling part on the long edge and/or of the female coupling part on the short edge for horizontal interlocking with both a male coupling part on the long edge and with a male coupling part on the short edge.

A preferred embodiment of the second aspect of the invention is characterized in that the slope of this section always runs distally, thus making coupling of the floor panels easier.

A preferred embodiment of the first aspect and/or of the second aspect of the invention is characterized in that the angle between the bottom lip of the female coupling part on the long edge and the proximal flank of the interlocking part of the female coupling part on the long edge is greater than 90° everywhere – and is preferably greater than 100° everywhere –, wherein this angle is the angle outside the material of the floor panel, preferably wherein this angle is between 100° and 135° in the bending point of this proximal flank. Such embodiments have the advantage that coupling by means of rotation can be performed more easily.

More preferably, the angle between the bottom lip of the female coupling part on the short edge and the proximal flank of the interlocking part of the female coupling part on the short edge is greater than 90° everywhere – and is preferably greater than 100° everywhere –, wherein this angle is the angle outside the material of the floor panel. Preferably, this angle is between 100° and 135° in the bending point of this proximal flank.

A preferred embodiment of the first aspect and/or of the second aspect of the invention is characterized in that the at least one pair of interlocking portions, in order to bring about the abovementioned vertical interlocking of the male coupling part on the short edge into the female coupling part on the long edge, comprises a first interlocking portion on this male coupling part and a second interlocking portion on the female coupling part which cooperates with the former in the coupled position; wherein the abovementioned

second interlocking portion which is present on the female coupling part is situated on the proximal side of the abovementioned upwardly pointing interlocking part. Preferably, the abovementioned second interlocking portion consists of an undercut, preferably in the form of a sloping surface under which the first interlocking portion may engage. Preferably, the male coupling part on the short edge and the female coupling part on the long edge are configured in such a way that the first interlocking portion can be brought behind the second interlocking portion by means of a downward movement of the male coupling part of the short edge, more particularly by means of a downward snap-fit movement.

Such embodiments ensure effective interlocking in a vertical direction, while still allowing easy coupling.

A preferred embodiment of the first aspect and/or of the second aspect of the invention is characterized in that the male coupling part on the short edge comprises a flange which extends laterally at the top and which has a downwardly extending interlocking part, and in that, for the abovementioned vertical interlocking, an additional pair of interlocking portions is provided, one interlocking portion of which is situated on the distal end of the abovementioned flange and/or downwardly extending interlocking part, while the other interlocking portion is then situated on the opposite floor panel. Such embodiments make it possible to achieve an interlocking in a horizontal direction in an effective way, and actually offer the possibility to provide effective interlocking portions.

Preferably, there is a pretension in the contact surface between the proximal end of the downwardly extending interlocking part of the male coupling part on the short edge and the upwardly pointing interlocking part of the female coupling part on the long edge between the male coupling part on the short edge and the female coupling part on the long edge in the coupled position, preferably by an overlap of the profiled sections of these interlocking parts in the uncoupled position.

A preferred embodiment of the first aspect and/or of the second aspect of the invention is characterized in that, for the abovementioned vertical interlocking of the male coupling part on the short edge into the female coupling part on the long edge, at least one pair of interlocking portions is provided, namely a first interlocking portion on this male

coupling part and a second interlocking portion on the female coupling part which cooperates with the former in the coupled position, wherein the abovementioned second interlocking portion which is present on the female coupling part is situated on the distal end of the bottom lip and/or of the upwardly pointing interlocking part, whereas the other abovementioned first interlocking portion is situated on the opposite floor panel. Such embodiments make it possible to achieve a vertical interlocking in an effective way.
More preferably, the interlocking portion which is situated on the distal end of the abovementioned bottom lip and/or of the upwardly pointing interlocking part consists of a projection or recess, whereas the interlocking portion which cooperates with the latter then consists of a recess or projection, respectively, in which case such a projection may consist, for example, of a bulge-shaped portion.

A preferred embodiment of the first aspect and/or of the second aspect of the invention is characterized in that the coupling parts on all four edges are integrally formed from the material of the floor panels.

A preferred embodiment of the first aspect and/or of the second aspect of the invention is characterized in that the female coupling part on the short edge and the female coupling part on the long edge are substantially congruent and are preferably identical to each other.

A preferred embodiment of the first aspect and/or of the second aspect of the invention is characterized in that, on the underside of the female part of the long edge and/or of the short edge, a recess is present which makes elastic bending during assembly easier. As a result thereof, the installation of the floor panels is simplified.

In preferred embodiments of the first aspect and/or of the second aspect of the invention, the floor panels are at least composed of a substrate which comprises at least a substrate layer which is produced on the basis of a composition which has one or more one or more of the following features, in so far as they do not conflict with each other:

- the composition comprises at least a thermoplastic;

- the composition comprises at least a plastic, such as polyvinyl chloride, polyethylene, polypropylene, polyethylene terephthalate, polyurethane and/or elastomer;
- the composition comprises one or more plasticizers in an amount of less than 20 phr and preferably in an amount of between 5 and 15 phr;
- the composition comprises one or more plasticizers in an amount of at least 20 phr;
- the composition comprises an inorganic filler, such as chalk, talc and/or limestone;
- the composition comprises an organic filler, such as wood particles, bamboo and/or cork particles;
- the composition comprises a mineral filler, such as ceramics; and/or
- the composition comprises mineral fiber structures, such as fibers of glass, talc and/or wollastonite;
- the composition contains a mineral binder, for example of Portland cement, plaster or magnesium oxide.

A preferred embodiment of the first aspect and/or of the second aspect of the invention is characterized in that the floor panels are so-called “resilient” or, alternatively, so-called “rigid” plastic-based floor panels – preferably these floor panels are based on polyvinyl chloride –, optionally containing fillers or other constituents, with the amount by weight of plastic preferably being less than 50 %.

The thickness of the floor panels is preferably between 2 and 9 mm, and more preferably between 3 and 6 mm. This makes it possible to make the floor panels sufficiently thin, while still being sufficiently strong and stable.

Preferably, the floor panels are decorative. To this end, they may be composed of a substrate and a top layer which is situated on top of the substrate and which comprises a decor layer. This decor layer preferably has a design or pattern which may simulate, for example, a natural product, such as wood, stone or ceramics. This may then consist of,

for example, a wood design or pattern. This design or pattern may then simulate, for example, wood grain or wood pores.

The decor layer preferably consists of a print which is applied, optionally directly, onto an underlying layer of the floor panel. If the print is not applied directly, it is typically applied onto a carrier sheet. This carrier sheet may involve, for example, a plastic film, such as a polyvinyl chloride film, polyurethane film, polypropylene film, polyethylene terephthalate film or polyethylene film. Preferably, the carrier sheet is attached to the substrate or another layer of the top layer by means of a thermal lamination process. When the print is applied directly onto an underlying layer of the floor panel, the so-called direct print, it is not ruled out that it is applied onto a base layer or primer provided on the underlying layer. Preferably, a digital printer, such as an inkjet printer, is used when printing directly.

Preferably, the top layer also comprises a transparent or translucent wear layer which is situated on top of the decor layer. This wear layer then forms a protection for the decor layer. This may involve, for example, a plastic-based wear layer which is applied either as a film, optionally together with the abovementioned printed film, for example by means of a thermal lamination process, or in liquid form and then cured on the substrate or another layer of the top layer. In case the wear layer comprises a film, this is preferably a thermoplastic film, in particular a polyvinyl chloride film, a polyurethane film, a polypropylene film, a polyethylene terephthalate film or a polyethylene film.

The top layer may be finished with a lacquer layer which is applied as a liquid layer onto the abovementioned wear layer and/or the abovementioned decor layer and is subsequently cured. Preferably, this is a lacquer layer which can be cured by UV light or excimer radiation or a layer which can be cured by means of raising the temperature. This latter layer may use, for example, blocked isocyanates as crosslinkers. Preferably, a lacquer layer is applied on top of the possible wear layer, but, according to an alternative, the lacquer layer may act as a wear layer.

The top layer may also be provided with impressions which are optionally in register with the decor layer. To this end, a roller is used such as described as such in WO2016/016864. The impressions provide the floor panels with a relief in such a way that they simulate a natural structure such as a wood structure even better. The impressions may, for example, be made in accordance with a wood grain pattern.

In addition to the substrate and the top layer, the floor panels may also comprise a backing layer which is situated under the substrate. The backing layer may, for example, be based on cork or based on a thermoplastic, which is preferably of the flexible type. Such a rather soft backing layer may give the floor panels new properties, for example with regard to comfort and sound absorption. In particular, the backing layer forms a layer with acoustic properties. The backing layer may contribute, for example, to a reduction in the production of sound by the floor panels, for example when someone walks over the latter.

As the above makes clear, the invention firstly provides floor panels which are composed of a substrate which is based on a plastic, such as polyvinyl chloride, polyethylene, polypropylene, polyethylene terephthalate and/or polyurethane. However, the invention is not limited to such floor panels. In general, it can be applied in any type of floor panel. Thus, it is for example not ruled out that the invention is used in floor panels having a wood-based substrate, such as an MDF or HDF substrate, which may be provided with a top layer of any kind, for example a laminate layer. The invention may also be used on floor panels with a wood-based substrate and a wooden top layer situated on top thereof, such as a top layer of wood veneer. In this case, the floor panels are referred to as being of the engineered wood type.

A preferred embodiment of the first aspect and/or of the second aspect of the invention is characterized in that the set of floor panels comprises two types of floor panels which are configured in such a way that a herringbone pattern may be produced, in which the coupling parts of the two types of floor panels are preferably mirrored with respect to each other.

In a preferred embodiment of the first aspect or of the second aspect of the invention, the bottom lip of the female coupling part on the long edge comprises a first support surface and a second support surface. In a coupled position with another panel, these support surfaces are both situated proximally from an open space between this bottom lip and either the bottom side of the tongue or the bottom side of the downwardly extending interlocking part. The first support surface is situated proximally from the second support surface. The first support surface is provided in order for making contact with the bottom side of the tongue of a male coupling part on the long edge of a coupled panel. The second support surface is a potential or actual support surface for the bottom side of the downwardly extending interlocking part of the male coupling part on the short edge. The term support surface is understood to mean that actual support is provided or that support may be provided. Such embodiments make it possible to optimize the ease of coupling. Alternatively, it is possible for the bottom lip to comprise a similar support surface both for the bottom side of the tongue of a male coupling part on the long edge of a coupled panel and for the bottom side of the downwardly extending interlocking part of the male coupling part on the short edge; wherein this support surface is proximal to an open space between this bottom lip and either the bottom side of the tongue or the bottom side of the downwardly extending interlocking part.

The third aspect of the invention relates to a method for installing a set of floor panels, wherein a set of panels such as in the first aspect and/or such as in the second aspect of the invention is used, wherein the set of panels comprises two types of floor panels which are configured in such a way that a herringbone pattern may be produced. The method comprises the feature that a herringbone pattern is produced.

In the resulting floor covering, the risk of differences in height, formation of gaps or cracks between the mutually coupled floor panels is minimized. This is due to the fact that a satisfactory interlocking is provided not only between the mutually coupled long edges but that a secure interlocking may also be provided between the mutually coupled short and long edges.

In addition, installation may be easy to perform.

The present invention – in its various aspects – can be applied particularly advantageously in floor panels comprising a substrate which is based on a plastic, such as polyvinyl chloride, polyethylene, polypropylene, polyethylene terephthalate and/or polyurethane. After all, these floor panels have been found to experience drastic dimensional changes as the temperature changes. These may result in compression of the floor covering and even to a moving apart of the coupled floor panels. However, the present invention is able to minimize this risk due to the secure interlocking which may be provided between the edges with respect to each other.

The substrate of the floor panels in the set of floor panels according to the first aspect and/or of the second aspect of the invention may optionally be multi-layered, but preferably comprises at least a substrate layer which is produced on the basis of a composition which has one or more of the following features insofar as these are not contradictory:

- The composition comprises at least a thermoplastic.
- The composition comprises at least a plastic, such as polyvinyl chloride, polyethylene, polypropylene, polyethylene terephthalate, polyurethane and/or an elastomer.
- The composition comprises one or more plasticizers in an amount of less than 20 phr and preferably in an amount between 5 and 15 phr. In case such an amount of plasticizers is used, a substrate layer of the rigid or stiff type is involved.
- The composition comprises one or more plasticizers in an amount of at least 20 phr. In this case, a substrate layer of the elastic or flexible type is involved.
- The composition comprises an inorganic filler, such as chalk, talc and/or limestone.
- The composition comprises an organic filler, such as wood particles, bamboo and/or cork particles.
- The composition comprises a mineral filler, such as ceramics.
- The composition comprises mineral fiber structures, such as fibers of glass, talc and/or wollastonite.

It should be noted that the presence of a substrate layer of the rigid type, i.e. containing an amount of plasticizer of less than 20 phr, benefits the dimensional stability of the floor panels. Together with the secure interlocking, this rigid substrate layer then provides an extremely stable floor covering.

If desired, the substrate layer may be foamed. This has the advantage that the density of the substrate layer can be reduced. Thus, it is possible to achieve a saving in raw materials and energy. Foaming may also provide the substrate layer with new properties, such as with regard to comfort and, more importantly, with regard to dimensional stability.

It should also be noted that the substrate layer may be produced in accordance with various possibilities. Thus, the substrate layer may be produced by means of spreading, extrusion, injection-molding, calender and/or coating techniques.

The substrate may be composed of several substrate layers. These substrate layers may be produced on the basis of a composition such as those mentioned above, but they do not have to be identical to each other. The substrate layers may differ, for example, on the basis of the amount of plasticizers used. In this case, it may involve the combination of an elastic substrate layer with a rigid substrate layer.

In a particularly preferred embodiment, the floor panels are of the so-called Luxury Vinyl Tile (LVT) or Wood Plastic Composite (WPC) type. For example, these are the floor panels which are configured as described in document US9,156,233B2.

Possibly, the substrate is provided with a reinforcing layer, such as a glass fiber cloth or a glass fleece or a glass fiber mesh. This reinforcing layer is then preferably incorporated in the substrate. This means that the reinforcing layer is then delimited by the material of the substrate on both its top and bottom side. This reinforcing layer helps to increase the dimensional stability of the floor panels and thus contributes in preventing the formation of gaps and cracks in the floor covering in a herringbone pattern. It should be noted that the substrate may be provided with several, optionally incorporated, reinforcement layers.

The thickness of the floor panels is preferably substantially, i.e. for half or more, formed by the substrate.

In summary, the independent aspects of sets of floor panels of the invention are not limited to specific types of materials of floor panels, but may be applied in all kinds of floor panels.

It should be noted that the expression "mechanical coupling parts" is understood to mean coupling parts which make it possible to bring about a mechanical interlocking. No adhesive or the like is thus required for the interlocking, but the use of adhesive is not ruled out.

In order to show the features of the invention in more detail, some preferred embodiments are described below by way of example and without being limited thereto, with reference to the accompanying drawings, in which:

- Fig. 1 shows a top view of two floor panels from a set according to the invention;
- Fig. 2 diagrammatically shows a partly constructed floor covering, comprising floor panels from Fig. 1 which have been fitted in a herringbone pattern;
- Fig. 3 diagrammatically and on a larger scale shows the portion which is denoted as F3 in Fig. 2, however during assembly of the floor panels;
- Fig. 4 shows a panel from a set of panels according to the invention along its long edges, panel as may be used in the floor covering of Fig. 1;
- Fig. 5 shows a panel from a set of panels according to the invention along its short edges, panel as may be used in the floor covering of Fig. 1;
- Fig. 6 shows a cross section along line VI-VI from Fig. 1;
- Fig. 7 shows a cross section along line VII-VII from Fig. 1;
- Fig. 8 illustrates the coupling of the male coupling part on the long edge by means of a horizontal sliding movement with snap-fit effect into the female coupling part on the short edge;

- Fig. 9 illustrates the coupling of the female coupling part on the short edge into the male coupling part on the long edge by means of a horizontal sliding movement with snap-fit effect;
- Fig. 10 illustrates the coupling by means of a rotating movement;
- Fig. 11 illustrates the fitting in a herringbone pattern, in which panels according to the invention may be fitted by means of a horizontal sliding movement;
- Fig. 12 illustrates a block motif in which the invention may also be applied;
- Fig. 13 shows – in an identical view to that from Fig. 7 – another embodiment of the invention;
- Figs. 14 and 15 show another embodiment of a set of panels according to the invention in the coupled position of the panels.

Fig. 1 shows a top view of two floor panels 1A, 1B from a set of floor panels according to the invention, which are different from each other and which are to this end denoted, more specifically, as 1A and 1B. These floor panels 1A-1B are suitable for forming a floor covering in a herringbone pattern, as will become clear from the following. The coupling parts of the two types of floor panels 1A, 1B are mirrored with respect to each other along the longitudinal axis of the panels.

In Fig. 2 a portion of the floor covering in a herringbone pattern is shown. In this floor covering, several of the floor panels 1A-1B from Fig. 1 have been used.

Fig. 4 shows a panel from a set of panels according to the invention on its long edges, panel as may be used in the floor covering from Fig. 1. Fig. 5 shows a panel from a set of panels according to the invention on its short edges, panel as may be used in the floor covering from Fig. 1.
Fig. 6 shows a cross section along line VI-VI from Fig. 1. Fig. 7 shows a cross section along line VII-VII from Fig. 1.

The reference numerals have the same meaning throughout the various figures.

The floor panels 1A-1B are elongate rectangular and therefore comprise a pair of long edges 2-3 and a pair of short edges 4-5. Both the long and the short edges 2-3-4-5 are provided with mechanical coupling parts 6-7-8-9 which allow several of such floor panels 1A-1B to be coupled together. The one long edge 2 is provided with a male coupling part 6 and the other long edge 3 is provided with a female coupling part 7. The one short edge 4 is provided with a male coupling part 8 and the other short edge 5 is provided with a female coupling part 9.

It is clear from Fig. 1 that the floor panel 1A is of a different type than the floor panel 1B. The reason for this is that the position of the coupling parts 6-7-8-9 in the floor panel 1A is mirrored with respect to the position of the coupling parts 6-7-8-9 in the floor panel 1B.

Fig. 3 shows how the floor panels 1A and 1B can be assembled systematically to form a herringbone pattern. The aim in Fig. 3 is that the floor panel 1B shown in an upwardly rotated position is connected to the horizontal floor panels 1A and 1B. The edge 2 comprising the male coupling part 6 of the floor panel 1B which is in the upwardly rotated position is in this case presented to the edge 3 of the horizontal floor panel 1B, following which these floor panels 1B are connected along the edges 2 and 3 by rotation by means of the rotating movement W. Due to the rotating movement W, a downward movement M is created on the short edge 4 which, according to the invention, results in a male coupling part 8 situated on the short edge 4 being coupled in an interlocking manner to the female coupling part 7 of the long edge 3 of the transverse floor panel 1A. This method of installation is known as a “fold-down” installation.

Fig. 4 shows a panel from a set of panels according to the invention on its long edges, panel as may be used in the floor covering from Fig. 1. Fig. 5 shows a panel from a set of panels according to the invention on its short edges, panel as may be used in the floor covering from Fig. 1.

Fig. 6 shows a cross section along line VI-VI from Fig. 1 in which panels as in Figs. 4 and 5 have been used. Fig. 7 shows a cross section along line VII-VII from Fig. 1 in which panels as in Figs. 4 and 5 have been used.

The floor panels 1A, 1B, illustrated in Figs. 4-7, are elongate rectangular and therefore comprise a pair of long edges 2-3 and a pair of short edges 4-5; wherein both the long and the short edges are provided with mechanical coupling parts 6-7-8-9 which allow the floor panels from the set to be coupled together; wherein the one long edge 2 is provided with a male coupling part 6 and the other long edge 3 is provided with a female coupling part 7; wherein the one short edge 4 is provided with a male coupling part 8 and the other short edge 5 is provided with a female coupling part 9. The male coupling part 6 on the long edge 2 can be fitted into the female coupling part 7 on the long edge 3 of a floor panel of the set by means of a rotating movement W. This rotating movement is illustrated in Fig. 10.

The male coupling part 6 on the long edge 2 can also be fitted into the female coupling part 9 on the short edge 5 of a floor panel from the set by means of a rotating movement. The male coupling part 8 on the short edge 4 can be fitted into the female coupling part 7 on the long edge 3 in one and the same rotating movement W which is used to fit the male coupling part 6 on the long edge 2 into the female coupling part 7 or 9 on the long or short edge 3 or 5, as is illustrated in Fig. 3.

The male coupling part 8 on the short edge 4 and the female coupling part 7 on the long edge 3 comprise interlocking parts which, in a mutually coupled position of such a short edge and long edge, bring about both an interlocking in a horizontal direction H and an interlocking in a vertical direction V; wherein the female coupling part on the long edge and on the short edge comprises a lateral groove 10 which is delimited by an upper lip 11 and a bottom lip 12, the bottom lip 12 of which extends distally beyond the upper lip 11 and is provided with an upwardly pointing interlocking part 13; wherein the male coupling part on the long edge is provided with a tongue 14 which, in the coupled position, can cooperate with the abovementioned lateral groove 10 in order to bring about a vertical interlocking; and wherein the set of floor panels comprises at least one pair of interlocking portions in order to bring about the abovementioned vertical interlocking of the male coupling part on the short edge into the female coupling part on the long edge.

As is illustrated in Fig. 8, the male coupling part 6 on the long edge 2 can be fitted into the female coupling part 9 on the short edge 5 of a floor panel from the set by means of a horizontal sliding movement S with snap-fit effect. As is illustrated in Fig. 9, this also

means that – due to the relativity of movements – the female coupling part 9 on the short edge 5 can be fitted into the male coupling part 6 on the long edge 2 by means of a horizontal sliding movement S with snap-fit effect.

The male coupling part 6 on the long edge 2 may be fitted into the female coupling part 7 on the long edge 3 of a floor panel of the set by means of a horizontal sliding movement S with snap-fit effect.

The panels illustrated in Figs. 4-7 – see also Figs. 8 and 9 – are configured in such a way that the male coupling part on the long edge 2 and the female coupling part on the short edge 5, when horizontally sliding a first panel from the set of floor panels with respect to a second panel from the set of floor panels in order to couple the male coupling part on the long edge 2 of the first panel to the female coupling part on the short edge 3 of the second panel, when sliding the bottom side 30 of the tongue 14 of the male coupling part on the long edge 2 over the upwardly pointing interlocking part 13 of the female coupling part on the short edge 5, the tongue 14 of the male coupling part on the long edge 2 is guided in the groove 10 of the female coupling part on the short edge. When sliding the bottom side 30 of the tongue 14 of the male coupling part on the long edge 2 over the upwardly pointing interlocking part 13 of the female coupling part on the short edge 5, in which case the tongue 14 of the male coupling part on the long edge 2 is guided in the groove 10 of the female coupling part on the short edge, no deformation of the tongue 14 of the male coupling part on the long edge 2 and no deformation of the bottom lip 12 of the female coupling part on the short edge 5 is required in order to insert this tongue 14 into this groove 10. The coupling parts are configured in such a way that when coupling the male coupling part 6 on the long edge 2 of a panel from the set by means of a horizontal sliding movement S with snap-fit effect into the female coupling part 9 on the short edge 5 of a floor panel, a bending and returning of the bottom lip 12 of the female coupling part 9 on the short edge 5 may take place.

In the panels illustrated in Figs. 4-7, the upwardly pointing interlocking part 13 of the female coupling part 7 on the long edge 3 and the upwardly pointing interlocking part 13 of the female coupling part 9 on the short edge 5, in cross section at right angles to the

respective edge, comprise a point 31 which is situated closest to the top side of the panel, wherein, when running through the section 32 of this interlocking part 13 proximally from this point, from proximally from this interlocking part 13 to the distal end of this interlocking part 13, the distance D to the level of the surface of the floor panel becomes continuously smaller. The slope of this section 32 always runs distally.

The panels illustrated in Figs. 4-7 illustrate an example in which the angle A between the bottom lip 12 of the female coupling part 7 on the long edge 3 and the proximal flank of the interlocking part 13 of the female coupling part 7 on the long edge 3 is greater than 90° everywhere, in the example, this angle A is 115° in the bending point of this proximal flank. In addition, the angle B between the bottom lip 12 of the female coupling part 9 on the short edge 5 and the proximal flank of the interlocking part 13 of the female coupling part 9 on the short edge 5 is greater than 90° everywhere; in the example, this angle A is 115° in the bending point of this proximal flank.

With the panels illustrated in Figs. 4-7, the male coupling part 8 on the short edge 4 comprises a flange 21 which extends laterally at the top and which has a downwardly extending interlocking part 22, wherein, for the abovementioned vertical interlocking, an additional pair of interlocking portions 17-18 is provided, one interlocking portion 17 of which is situated on the distal end of the abovementioned flange 21 and/or downwardly extending interlocking part 22, while the other interlocking portion 18 is then situated on the opposite floor panel.

In order to bring about the abovementioned vertical interlocking of the male coupling part 8 of the short edge 4 into the female coupling part 7 on the long edge 3, the panels illustrated in Figs. 4-7 comprise a first interlocking portion 19 on this male coupling part 8 and a second interlocking portion 20 on the female coupling part 7 which cooperates with the former in the coupled position, wherein the abovementioned second interlocking portion 20 which is present on the female coupling part is situated on the distal end of the upwardly pointing interlocking part 13, wherein the abovementioned other first interlocking portion 9 is situated on the opposite floor panel. The interlocking in a

vertical direction by these interlocking portions 19, 20 in the coupled position may take place with or without contact between these interlocking portions 19, 20.

In the examples shown in Figs. 4-7, the coupling parts on all four edges are integrally formed from the material of the floor panels. In these examples, the female coupling part on the short edge and the female coupling part on the long edge are of identical design.

In the examples shown in Figs. 4-7, a recess 23 is present on the underside of the female part of the long edge 3 and of the short edge 5, which recess 23 makes elastic bending during assembly easier.

In the examples shown in Figs. 4-7, an identical surface 33 proximally to the upwardly pointing interlocking part of the female coupling part 7 on the long edge 3 and to the female coupling part 9 on the short edge 5 is used, intended for horizontal interlocking with both a male coupling part 6 on the long edge 2 and a male coupling part 8 on the short edge 4.

Preferably, there is a pretension in the contact surface between the proximal end of the downwardly extending interlocking part 22 and the upwardly pointing interlocking part 13 between the male coupling part 8 of the short edge 4 and the female coupling part 7 of the long edge 3 in the coupled position, this pretension being caused by an overlap of the profiled sections of these interlocking parts in the uncoupled position.

Fig. 11 illustrates the installation of a set of panels 1A, 1B in a herringbone pattern, for example such as in Fig. 1. The reference numerals have the same meaning as in the other figures. The panel 49, a panel of type 1A, could simply be added by means of the “fold down” method. However, due to the position of the coupling parts, this is not possible with the panel 50. Nevertheless, this panel may be coupled by horizontally sliding with a snap-fit movement in the direction of arrow 51, in which case both the female coupling part on the short edge 5 of the panel 50 is coupled into the male coupling part on the long edge 2 of an already fitted panel, and the female coupling part on the long edge 3 of the panel 50 may be coupled into the male coupling part on the long edge 2 of another already

fitted panel and also on the male coupling part on the short side 4 of yet another already fitted panel. In this way, it is possible to start laying a herringbone pattern in the center of a room, in which panels are laid in the various directions by means of the fold-down method or via horizontal sliding. The advantage is that the herringbone pattern can easily be laid accurately centered in a room.

The manner of coupling by means of horizontal sliding can also be used in an advantageous way along the edges of the room.

Fig. 12 illustrates how such floor panels according to the first aspect and/or according to the second aspect of the invention may also be fitted in a block motif. For the illustrated block motif, one type of panels 1A is sufficient; and it is not necessary to use two types 1A and 1B as is the case when laying in a herringbone pattern.

Fig. 13 shows – in the same view from Fig. 7 – another embodiment of the invention. These panels are largely similar to the panels illustrated in Figs. 4-7. In order to bring about the vertical interlocking of the male coupling part 8 of the short edge 4 into the female coupling part 7 on the long edge 3, these panels from Fig. 13 comprise a first interlocking portion 15 on this male coupling part 8 and a second interlocking portion 16 on the female coupling part 7 which cooperates with the former in the coupled position; wherein the abovementioned second interlocking portion 16 which is present on the female coupling part 7 is situated on the proximal side of the abovementioned upwardly pointing interlocking part 13. This second interlocking portion 16 consists of an undercut in the form of a sloping surface under which the first interlocking portion 15 may engage. The male coupling part 8 of the short edge 4 and the female coupling part 7 on the long edge 3 are configured in such a way that the first interlocking portion 15 can be brought behind the second interlocking portion 16 by means of a downward movement of the male coupling part 8 of the short edge 4, more particularly by means of a downward snap-fit movement M1. The contact between this first interlocking portion 15 and the second interlocking portion 16 preferably takes place under pretension.

Figs. 14 and 15 show another embodiment of a set of panels according to the invention in the coupled position of the panels. In a view similar to that from Fig. 6, Fig. 14 shows the coupling of a panel 1A along its long edge 2 with its male coupling part 6 into the

female coupling part 7 on the long edge 3 of such another panel 1A. In a view similar to that from Fig. 7, Fig. 15 shows the coupling of a panel 1A along its short edge 4 with its male coupling part 8 into the female coupling part 7 on the long edge 3 of such another panel 1B. The reference numerals have the same meaning as in the other figures. The bottom lip 12 of the female coupling part 7 on the long edge 3 comprises a first support surface 60 and a second support surface 61, both situated at a different distance from the bottom side of the panel. In the coupled position with another panel, the first support surface 60 and the second support surface 61 are both situated proximally to an open space 62, 63 between the bottom lip 12 and either the bottom side of the tongue 14 or the bottom side of the downwardly extending interlocking part 22 of the other panel. The first support surface 60 is situated proximally to the second support surface 61, wherein the first support surface 60 is provided to make contact with the bottom side of the tongue 14 of a male coupling part 6 on the long edge 2 of a coupled panel. The second support surface 61 is a potential or actual support surface for the bottom side of the downwardly extending interlocking part 22 of the male coupling part 8 on the short edge 4. The term support surface is understood to mean that actual support is provided or that support may be provided.

With the examples shown in Figs. 6 and 7, the bottom lip 12 comprises an identical support surface – situated proximally to an open space – both for the bottom side of the tongue 14 of a male coupling part 6 on the long edge 2 of a coupled panel and for the bottom side of the downwardly extending interlocking part 22 of the male coupling part 8 on the short edge 4.

In the example from Fig. 15, the interlocking in the vertical direction is performed by the interlocking portions 19, 20, with these interlocking portions 19, 20 being in contact in the coupled position.

It should be noted that, in the invention, the coupling parts 6-7 may be configured in such a way that they provide a tensioning force in the coupled position which pushes the top sides of the coupled edges 2-3 towards each other. The principle from Fig. 23 of document WO 97/47834 may be used for this purpose. The bottom lip 25 may then be permanently bent slightly downwards, for example in the coupled position.

In the examples, the female coupling part 9 on the short edge 5 is identical to the female coupling part 7 on the long edge 3. However, it should be clear that this female coupling part 9 does not necessarily have to have the same shape as the female coupling part on the long edges, but that it is sufficient if the functionalities discussed above are present in order to bring about the respective aspects of the invention.

It will be clear that the bottom lip 12, where necessary, will be sufficiently flexible to allow interlocking or unlocking, respectively, during the inward and/or outward rotating movement. In specific embodiments, it may also be provided that the tongue 14 can be snap-fitted horizontally into the groove 10, which is the case, for example, in Fig. 13.

It should be noted that where reference is made to the "upwardly pointing interlocking part of the bottom lip", this may refer to both an interlocking part which actually protrudes above the average level of the top side of the lip, and an interlocking part which is situated partly or even entirely below this level, but which has a recess in the top side of the bottom lip proximally thereto. Since, in the latter case, a recess is situated in front of the interlocking part, the adjacent interlocking part is automatically also "upwardly pointing".

It is also clear that the term "interlocking portion" may relate both to the material portion or the zone which results from the respective interlocking and to the interlocking surface thereof which brings about the interlocking.

The present invention is by no means limited to the above-described embodiments, but such methods and floor panels may be produced according to different variants without departing from the scope of the present invention.

Claims.

1.- Set of floor panels, wherein these floor panels (1A-1B) are elongate rectangular and therefore comprise a pair of long edges (2-3) and a pair of short edges (4-5); wherein both the long and the short edges are provided with mechanical coupling parts (6-7-8-9) which allow the floor panels from the set to be coupled together; wherein the one long edge (2) is provided with a male coupling part (6) and the other long edge (3) is provided with a female coupling part (7); wherein the one short edge (4) is provided with a male coupling part (8) and the other short edge (5) is provided with a female coupling part (9); wherein the male coupling part (6) on the long edge (2) can be fitted into the female coupling part (7) on the long edge (3) of a floor panel of the set by means of a rotating movement (W); wherein the male coupling part (6) on the long edge (2) can also be fitted into the female coupling part (9) on the short edge (5) of a floor panel from the set by means of a rotating movement (W); and wherein the male coupling part (8) on the short edge (4) can be fitted into the female coupling part (7) on the long edge (3) in one and the same rotating movement (W) which is used to fit the male coupling part (6) on the long edge (2) into the female coupling part (7 or 9) on the long or short edge (3 or 5); wherein the male coupling part (8) on the short edge (4) and the female coupling part (7) on the long edge (3) comprise interlocking parts which, in a mutually coupled position of such a short edge and long edge, bring about an interlocking in a horizontal direction (H) and an interlocking in a vertical direction (V); wherein the female coupling part on the long edge and on the short edge comprises a lateral groove (10) which is delimited by an upper lip (11) and a bottom lip (12), the bottom lip (12) of which extends distally beyond the upper lip (11) and is provided with an upwardly pointing interlocking part (13); wherein the male coupling part on the long edge is provided with a tongue (14) which, in the coupled position, can cooperate with the abovementioned lateral groove (10) in order to bring about a vertical interlocking; and wherein the set of floor panels comprises at least one pair of interlocking portions (15, 16, 17, 18, 19, 20) in order to bring about the abovementioned vertical interlocking of the male coupling part on the short edge into the female coupling part on the long edge,

characterized in that the male coupling part (6) on the long edge (2) may be fitted into the female coupling part (9) on the short edge (5) of a floor panel from the set by means of a horizontal sliding movement (S) with snap-fit effect; preferably wherein the male coupling part (6) on the long edge (2) may be fitted into the female coupling part (7) on the long edge (3) of a floor panel of the set by means of a horizontal sliding movement (S) with snap-fit effect.

2.- Set of floor panels in accordance with claim 1, characterized in that the male coupling part on the long edge (2) and the female coupling part on the short edge (5) are configured in such a way that when horizontally sliding a first panel from the set of floor panels with respect to a second panel from the set of floor panels in order to couple the male coupling part on the long edge (2) of the first panel to the female coupling part on the short edge (5) of the second panel, when sliding the bottom side (30) of the tongue (14) of the male coupling part on the long edge (2) over the upwardly pointing interlocking part (13) of the female coupling part on the short edge (5), the tongue (14) of the male coupling part on the long edge (2) is guided in the groove (10) of the female coupling part on the short edge.

3.- Set of floor panels in accordance with any of the preceding claims, characterized in that the male coupling part (6) on the long edge (2) and the female coupling part (9) on the short edge (5) are configured such that, when horizontally sliding a first panel from the set of floor panels with respect to a second panel from the set of floor panels to couple the male coupling part on the long edge (2) of the first panel to the female coupling part on the short edge (5) of the second panel, when sliding the bottom side (30) of the tongue (14) of the male coupling part on the long edge (2) over the upwardly pointing interlocking part (13) of the female coupling part on the short edge (5), the tongue (14) of the male coupling part on the long edge (2) is guided in the groove (10) of the female coupling part on the short edge, wherein no deformation of the tongue (14) of the male coupling part on the long edge (2) and no deformation of the bottom lip (12) of the female coupling part on the short edge (5) is required in order to insert this tongue (14) into this groove (10).

4.- Set of floor panels in accordance with any of the preceding claims, characterized in that, when coupling the male coupling part (6) on the long edge (2) of a panel from the set by means of a horizontal sliding movement (S) with snap-fit effect into the female coupling part (9) on the short edge (5) of a floor panel, a bending and returning of the bottom lip (12) of the female coupling part (9) on the short edge (5) takes place.

5.- Set of floor panels, optionally in accordance with any of the preceding claims, wherein these floor panels (1A-1B) are elongate rectangular and therefore comprise a pair of long edges (2-3) and a pair of short edges (4-5); wherein both the long and the short edges are provided with mechanical coupling parts (6-7-8-9) which allow the floor panels from the set to be coupled together; wherein the one long edge (2) is provided with a male coupling part (6) and the other long edge (3) is provided with a female coupling part (7); wherein the one short edge (4) is provided with a male coupling part (8) and the other short edge (5) is provided with a female coupling part (9); wherein the male coupling part (6) on the long edge (2) can be fitted into the female coupling part (7) on the long edge (3) of a floor panel of the set by means of a rotating movement (W); wherein the male coupling part (6) on the long edge (2) can also be fitted into the female coupling part (9) on the short edge (5) of a floor panel from the set by means of a rotating movement (W); and wherein the male coupling part (8) on the short edge (4) can be fitted into the female coupling part (7) on the long edge (3) in one and the same rotating movement (W) which is used to fit the male coupling part (6) on the long edge (2) into the female coupling part (7 or 9) on the long or short edge (3 or 5); wherein the male coupling part (8) on the short edge (4) and the female coupling part (7) on the long edge (3) have interlocking parts which, in a mutually coupled position of such a short edge and long edge, bring about an interlocking in a horizontal direction (H) and an interlocking in a vertical direction (V); wherein the female coupling part on the long edge and on the short edge comprises a lateral groove (10) which is delimited by an upper lip (11) and a bottom lip (12), the bottom lip (12) of which extends distally beyond the upper lip (11) and is provided with an upwardly pointing interlocking part (13); wherein the male coupling part on the long edge is provided with a tongue (14) which, in the coupled position, can cooperate with the abovementioned lateral groove (10) in order to bring about a vertical interlocking; and wherein the set of floor panels comprises at least one

pair of interlocking portions (15, 16, 17, 18, 19, 20) in order to bring about the abovementioned vertical interlocking of the male coupling part on the short edge into the female coupling part on the long edge,

characterized in that the upwardly pointing interlocking part (13) of the female coupling part (7) on the long edge (3) and/or the upwardly pointing interlocking part (13) of the female coupling part (9) on the short edge (5), in cross section at right angles to the respective edge, comprises a point (31) which is situated closest to the top side of the panel, and wherein, when running through the section (32) of this interlocking part (13) proximally from this point, from proximally from this interlocking part (13) to the distal end of this interlocking part (13), the distance (D) to the level of the surface of the floor panel becomes continuously smaller, preferably wherein the same face (33) may be used proximally to the upwardly pointing interlocking part of the female coupling part (7) on the long edge (3) and/or of the female coupling part (9) on the short edge (5) for horizontal interlocking both with a male coupling part (6) on the long edge (2) and with a male coupling part (8) on the short edge (4).

6.- Set of floor panels in accordance with claim 5, characterized in that the slope of this section (32) always runs distally.

7.- Set of floor panels in accordance with any of the preceding claims 1-6, characterized in that the angle (A) between the bottom lip (12) of the female coupling part (7) on the long edge (3) and the proximal flank of the interlocking part (13) of the female coupling part (7) on the long edge (3) is greater than 90° everywhere – and is preferably greater than 100° everywhere –, wherein this angle (A) is the angle outside the material of the floor panel, preferably wherein this angle is between 100° and 135° in the bending point of this proximal flank.

8.- Set of floor panels in accordance with claim 7, characterized in that the angle (B) between the bottom lip (12) of the female coupling part (9) on the short edge (5) and the proximal flank of the interlocking part (13) of the female coupling part (9) on the short edge (5) is greater than 90° everywhere – and is preferably greater than 100° everywhere

–, wherein this angle (B) is the angle outside the material of the floor panel, preferably wherein this angle is between 100° and 135° in the bending point of this proximal flank.

9.- Set of floor panels in accordance with any of the preceding claims 1-6, characterized in that the at least one pair of interlocking portions, in order to bring about the abovementioned vertical interlocking of the male coupling part (8) of the short edge (4) into the female coupling part (7) on the long edge (3), comprises a first interlocking portion (15) on this male coupling part and a second interlocking portion (16) on the female coupling part which cooperates with the former in the coupled position; wherein the abovementioned second interlocking portion (16) which is present on the female coupling part is situated on the proximal side of the abovementioned upwardly pointing interlocking part (13).

10.- Set of floor panels in accordance with claim 9, characterized in that the abovementioned second interlocking portion (16) consists of an undercut, preferably in the form of a sloping surface under which the first interlocking portion (15) may engage.

11.- Set of floor panels in accordance with claim 9 or 10, characterized in that the male coupling part (8) of the short edge (4) and the female coupling part (7) on the long edge (3) are configured in such a way that the first interlocking portion (15) can be brought behind the second interlocking portion (16) by means of a downward movement of the male coupling part (8) of the short edge (4), more particularly by means of a downward snap-fit movement (M1).

12.- Set of floor panels in accordance with any of the preceding claims, characterized in that the male coupling part (8) on the short edge (4) comprises a flange (21) which extends laterally at the top and which has a downwardly extending interlocking part (22), and in that, for the abovementioned vertical interlocking, an additional pair of interlocking portions (17-18) is provided, one interlocking portion of which is situated on the distal end of the abovementioned flange (21) and/or downwardly extending interlocking part (22), while the other interlocking portion is then situated on the opposite floor panel, preferably wherein there is a pretension in the contact surface between the

proximal end of the downwardly extending interlocking part (22) of the male coupling part (8) on the short edge (4) and the upwardly pointing interlocking part (13) of the female coupling part (7) on the long edge (3) between the male coupling part (8) on the short edge (4) and the female coupling part (7) on the long edge (3) in the coupled position, preferably by an overlap of the profiled sections of these interlocking parts in the uncoupled position.

13.- Set of floor panels in accordance with any of the preceding claims, characterized in that, for the abovementioned vertical interlocking of the male coupling part (8) on the short edge (4) into the female coupling part (7) on the long edge (3), at least one pair of interlocking portions (19-20) is provided, namely a first interlocking portion (19) on this male coupling part (8) and a second interlocking portion (20) on the female coupling part (7) which cooperates with the former in the coupled position, wherein the abovementioned second interlocking portion (20) which is present on the female coupling part is situated on the distal end of the bottom lip (12) and/or of the upwardly pointing interlocking part (13), whereas the other abovementioned first interlocking portion (19) is situated on the opposite floor panel.

14.- Set of floor panels in accordance with claim 13, characterized in that the interlocking portion which is situated on the distal end of the abovementioned bottom lip and/or of the upwardly pointing interlocking part consists of a projection or recess, whereas the interlocking portion which cooperates with the latter then consists of a recess or projection, respectively, in which case such a projection may consist, for example, of a bulge-shaped portion.

15.- Set of floor panels in accordance with any of the preceding claims, characterized in that the coupling parts on all four edges are integrally formed from the material of the floor panels.

16.- Set of floor panels in accordance with any of the preceding claims, characterized in that the female coupling part on the short edge and the female coupling part on the long edge are substantially congruent and are preferably identical to each other.

17.- Set of floor panels in accordance with any of the preceding claims, characterized in that, on the underside of the female part of the long edge and/or of the short edge, a recess (23) is present which makes elastic bending during assembly easier.

18.- Set of floor panels in accordance with any of the preceding claims, wherein the floor panels are at least composed of a substrate which comprises at least a substrate layer which is produced on the basis of a composition which has one or more of the following features, in so far as they do not conflict with each other: insofar as they are not contradictory:

- the composition comprises at least a thermoplastic;
- the composition comprises at least a plastic, such as polyvinyl chloride, polyethylene, polypropylene, polyethylene terephthalate, polyurethane and/or elastomer;
- the composition comprises one or more plasticizers in an amount of less than 20 phr and preferably in an amount of between 5 and 15 phr;
- the composition comprises one or more plasticizers in an amount of at least 20 phr;
- the composition comprises an inorganic filler, such as chalk, talc and/or limestone;
- the composition comprises an organic filler, such as wood particles, bamboo and/or cork particles;
- the composition comprises a mineral filler, such as ceramics; and/or
- the composition comprises mineral fiber structures, such as fibers of glass, talc and/or wollastonite;
- the composition contains a mineral binder, for example of Portland cement, plaster or magnesium oxide.

19.- Set of floor panels in accordance with any of the preceding claims 1 to 18, characterized in that the floor panels are so-called “resilient” or, alternatively, so-called “rigid” plastic-based floor panels – preferably these floor panels are based on polyvinyl

chloride –, optionally containing fillers or other constituents, with the amount by weight of plastic preferably being less than 50 %.

20.- Set of floor panels in accordance with any of claims 1 to 18, characterized in that the floor panels have a wood-based core, preferably an MDF or HDF core, and more particularly are laminate floor panels.

21.- Set of floor panels in accordance with any of the preceding claims, wherein the floor panels are at least composed of a substrate and a top layer situated on top of the substrate; and wherein the top layer comprises a decor layer and a translucent or transparent wear layer which is situated on top of the decor layer.

22.- Set of floor panels in accordance with any of the preceding claims, wherein the thickness of the floor panels is between 2 and 9 mm and preferably between 3 and 6 mm.

23.- Set of floor panels in accordance with any of the preceding claims, wherein the bottom lip (12) of the female coupling part (7) on the long edge (3) comprises a first support surface (60) and a second support surface (61) – preferably situated at a different distance from the bottom side of the panel –, wherein the first support surface (60) and the second support surface (61), in the coupled position with another panel, are both situated proximally from an open space (62, 63) between the bottom lip (12) and either the bottom side of the tongue (14) or the bottom side of the downwardly extending interlocking part (22) of the other panel, wherein the first support surface (60) is situated proximally from the second support surface (61), wherein the first support surface (60) is provided for making contact with the bottom side of the tongue (14) of a male coupling part (6) on the long edge (2) of a coupled panel, wherein the second support surface (61) is a potential or actual support surface for the bottom side of the downwardly extending interlocking part (22) of the male coupling part (8) on the short edge (4).

24.- Set of floor panels in accordance with any of the preceding claims, characterized in that it comprises two types of floor panels which are configured in such a way that a

herringbone pattern may be produced, preferably wherein the coupling parts of the two types of floor panels are mirrored with respect to each other.

25.- Method for installing a set of floor panels, characterized in that a set according to claim 24 is used, and in that a herringbone pattern is produced.

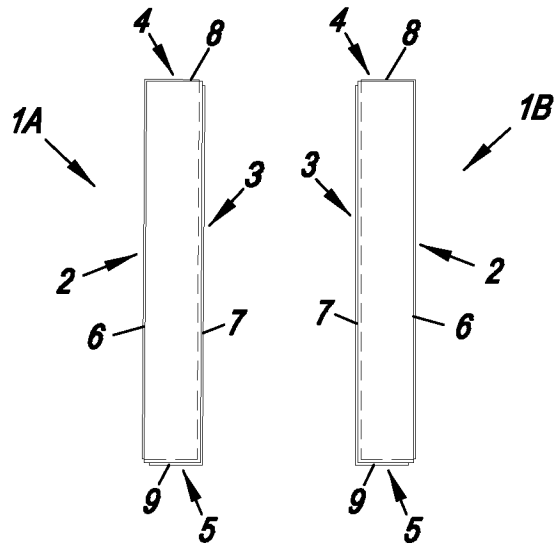

Fig. 1

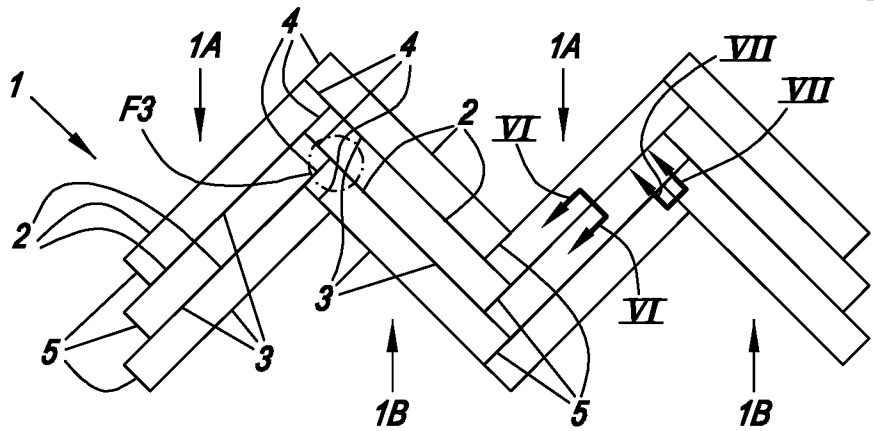

Fig. 2

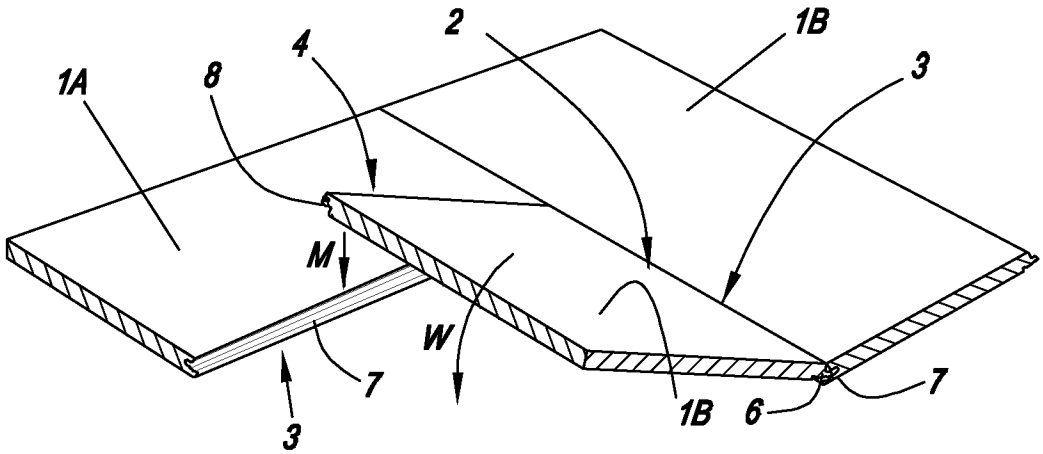

Fig. 3

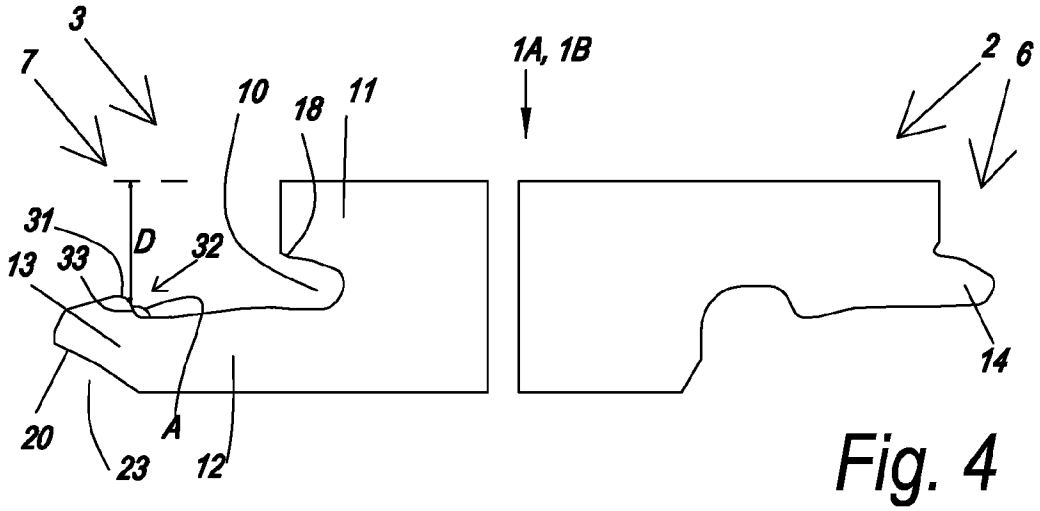

Fig. 4

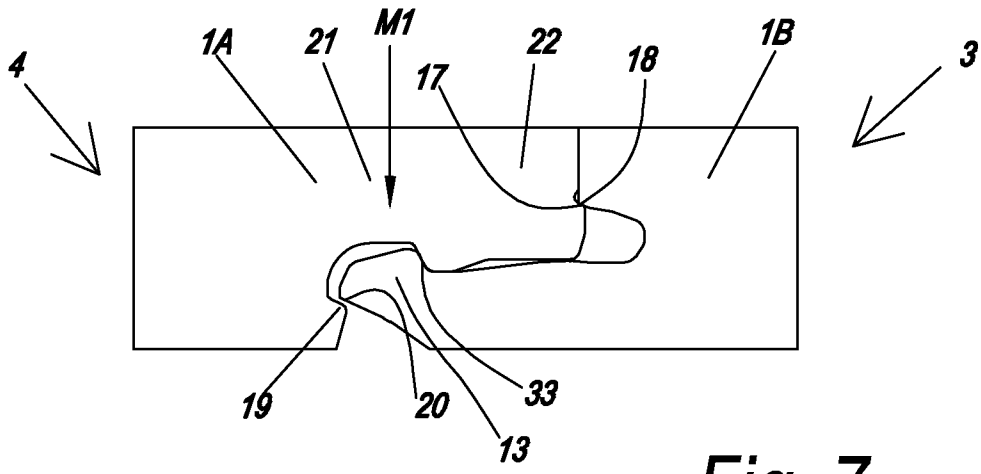

Fig. 7

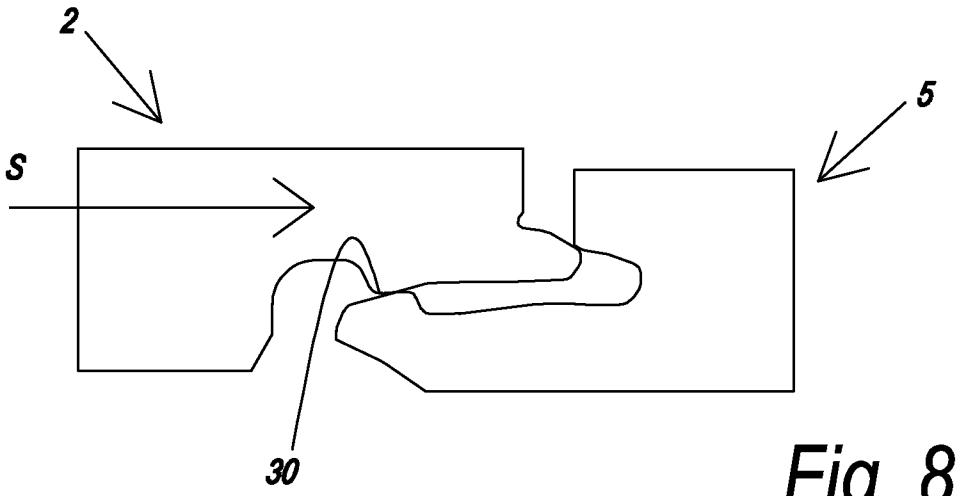

Fig. 8

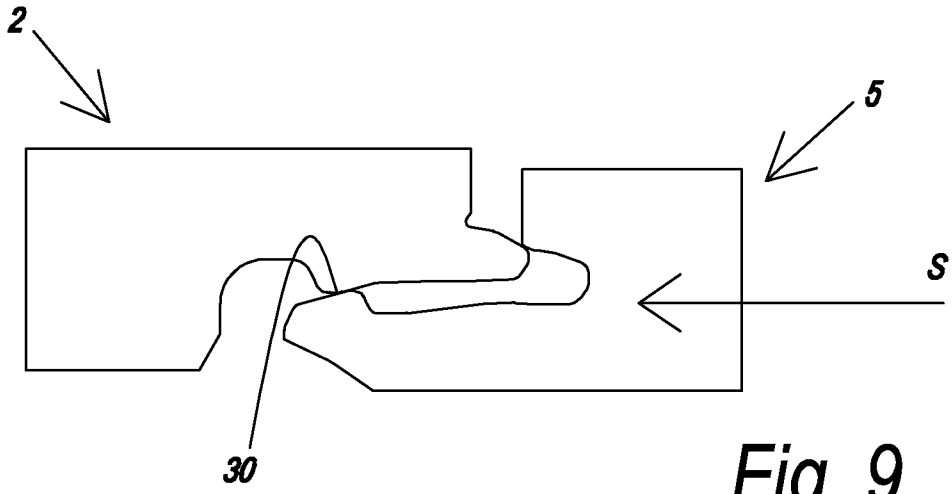

Fig. 9

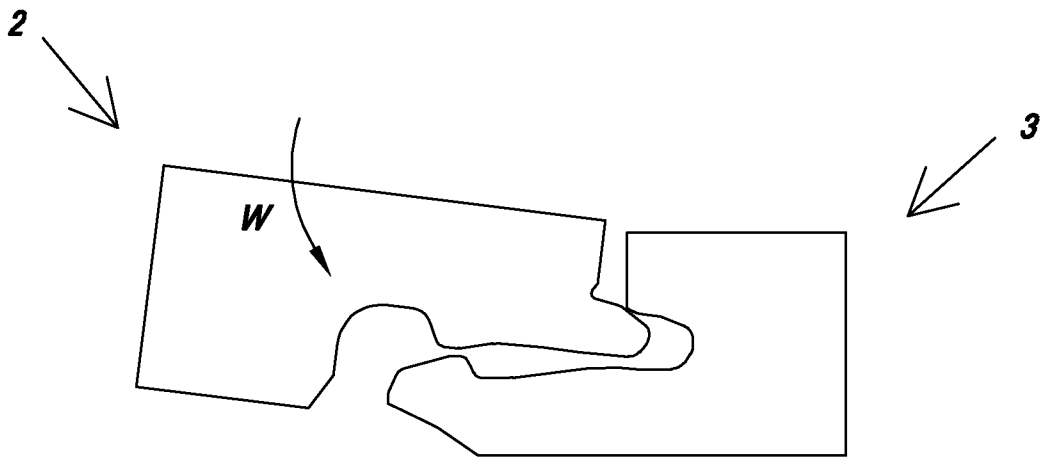

Fig. 10

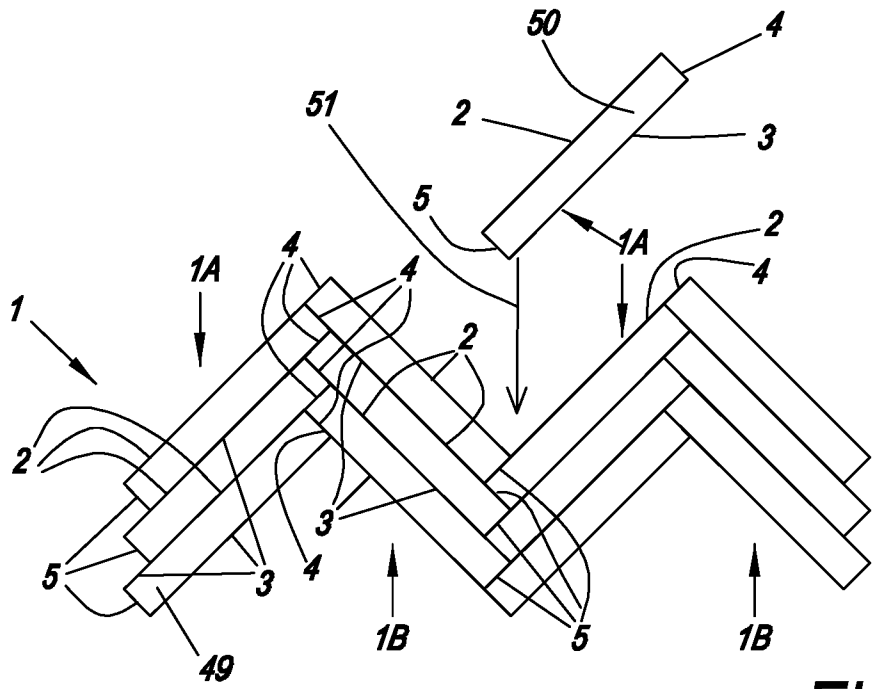

Fig. 11

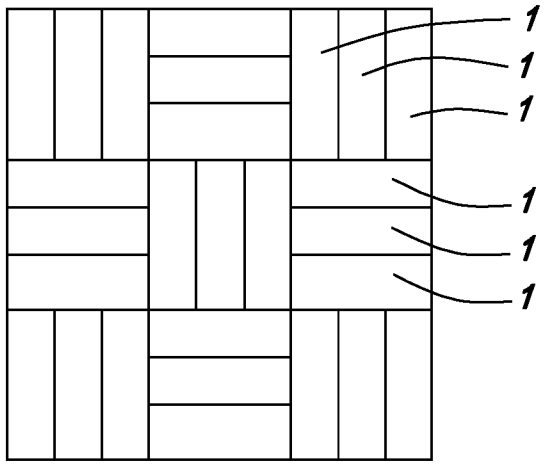

Fig. 12

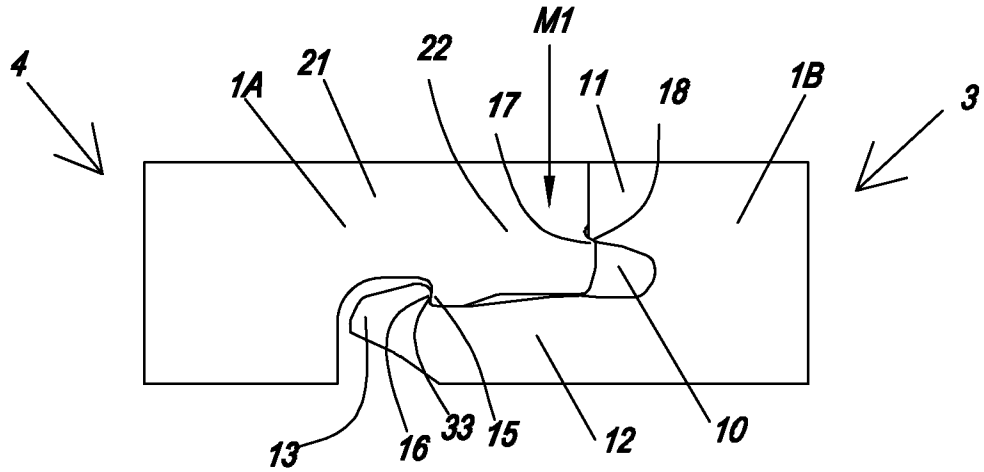

Fig. 13

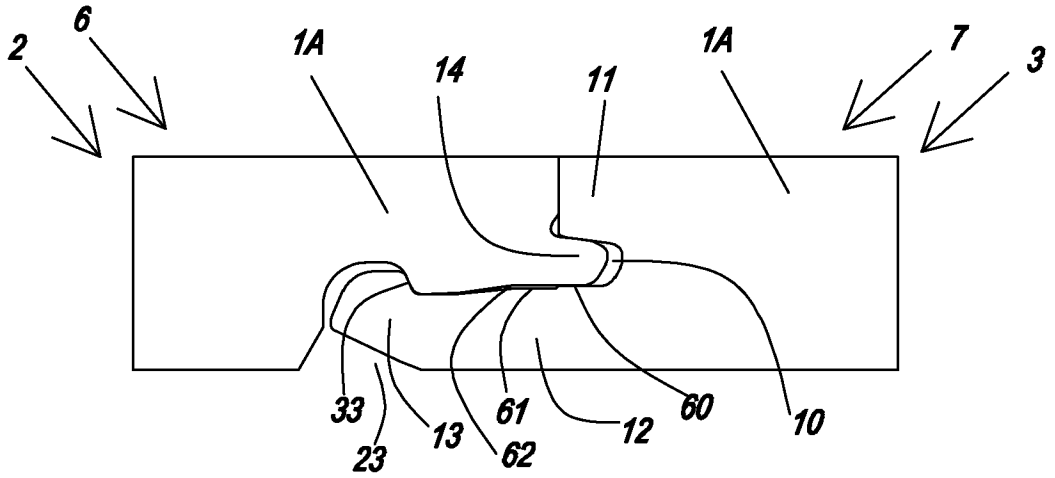
2
6
1A
14
11
1A
7
3
33
23
13
61
62
12
60
10

Fig. 14

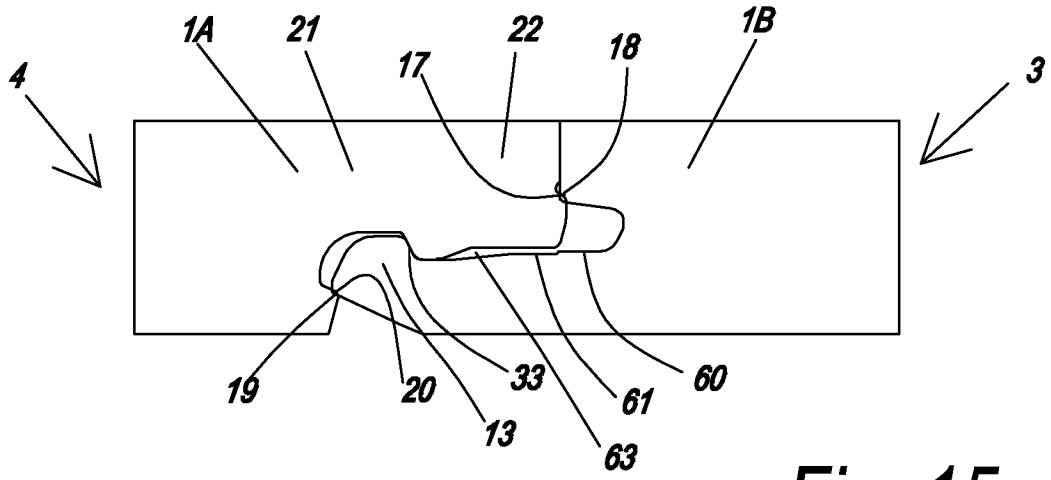
4
1A
21
17
22
18
1B
3
19
20
13
33
63
61
60

Fig. 15

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2022/050370

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2019/138365 A1 (FLOORING IND LTD SARL [LU]) 18 July 2019 (2019-07-18) cited in the application page 23, lines 11-14; figures 1-4, 13	1-25
X	WO 2017/187298 A2 (FLOORING IND LTD SARL [LU]) 2 November 2017 (2017-11-02) cited in the application figures 1-4, 6	1-9,11, 12,15-25

☐ 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
8 April 2022	22/04/2022

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	Fournier, Thomas

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2022/050370

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2019138365 A1	18-07-2019	EP 3737805 A1	18-11-2020
		US 2020340254 A1	29-10-2020
		US 2022064964 A1	03-03-2022
		WO 2019138365 A1	18-07-2019
WO 2017187298 A2	02-11-2017	NONE	