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(54) STAIR STRUCTURE COMPRISING L-PROFILE SHAPED ELEMENTS AND METHOD FOR INSTALLING SAME

TREPPENSTRUKTUR MIT L-PROFIL FÖRMIGEN ELEMENTEN UND VERFAHREN IHRER INSTALLATION

STRUCTURE D'ESCALIER COMPRENANT DES ÉLÉMENTS EN FORME DE PROFIL EN L AND SON PROCÉDÉ D'INSTALLATION

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Description

FIELD OF THE INVENTION

[0001] The invention relates to the stair structure defined in the preamble of claim 1, and to the methods for installing the stair structure defined in the preamble of claim 12.

BACKGROUND OF THE INVENTION

[0002] Known from the prior art are different floor, ceiling and wall elements formed from a composite material for both interior and exterior use. Composite materials have lately become more general in the manufacture of different surface elements by virtue of their easy maintenance, tailored weather-resistance and new color palette.

[0003] Furthermore, it is known to use different edge strips in connection with floor or terrace structures formed from a composite material to finish the visual look. However, a problem in the use of the known edge strips is that they are easily loosened and seldom withstand intensive wear and use.

[0004] In addition, known from the prior art are different stair structures. Stairs have mainly been built from wood, concrete or metal. Known from publication US 4951434 is a stair structure formed from plastic or carbon fiber, wherein the structure includes more than one step. The structure is formed by injection molding.

DE2921457A1 discloses stairs, where corner profiles are connected to threads and risers.

DE9214772U1 discloses a corner part for stairs.

DE202009013314U1 and US2006242916A1 disclose a corner profile for a terrace structure.

OBJECTIVE OF THE INVENTION

[0005] An objective of the invention is to disclose a new type of a stair structure. In addition, an objective of the invention is to disclose a method for installing a stair structure by joining L-profile shaped elements to each other.

SUMMARY OF THE INVENTION

[0006] The stair structure and the installation methods therefor according to the invention are characterized by what is presented in the claims.

[0007] The stair structure according to the invention is based on an L-profile shaped element. According to the invention the L-profile shaped element is formed as a monolithic piece, and the L-profile shaped element includes a first and a second leg, wherein the legs are arranged to have substantially the same thicknesses, at least one edge of each leg is provided with joint parts functioning in substantially the same manner, and the element is turnable to a desired position.

[0008] An L-profile shaped element means in this context a profile of any length having an L-shaped cross section. The dimensions of the L-profile shaped element, such as the length as well as the width and thickness of the legs, may vary depending on the application. Preferably, the thicknesses of the legs as well as the widths of the inner and outer surfaces are predetermined and depend on the purpose of use of the L-profile shaped elements. In this invention the L-profile shaped element is preferably used as an angular element in order to form an angular structure. The L-profile shaped element preferably includes an interior angle and an exterior angle. According to the invention, joint parts functioning in the same manner are to be fitted to the edges of the legs, i.e. to the edges in the thickness direction, of the L-profile shaped element. According to the invention a joint part is to function in the same manner in the interior as well as exterior of the L-profile shaped element, regardless which way around the element has been turned. In this connection the joint part may be shaped for a joint member, or it may function as one directly. Preferably, the joint parts of the legs must be equally thick or disposed at the same height in the thickness direction of the leg, so that the legs of the elements to be joined are set flush with each other when joined together. Preferably, there is less than 2mm, more preferably less than 1mm, of deviation in the thickness or mounting height of the joint parts. A groove or tongue structure is used as a joint part.

[0009] In one embodiment the thickness of the leg of the L-profile shaped element is between 3 and 100 mm, preferably between 20 and 35 mm and more preferably between 25 and 30 mm. Preferably, the difference in the thickness between the legs is less than 2mm, more preferably less than 1mm.

[0010] In one embodiment the width of the external dimension of at least one leg of the L-profile shaped element is between 30 and 280 mm, preferably between 40 and 250 mm and more preferably between 50 and 120 mm, and the width of the dimension of the inner surface is between 27 and 397 mm, preferably between 28 and 288 mm and in one preferred embodiment between 55 and 125 mm. In one embodiment the width of the external dimension of at least one leg of the L-profile shaped element is between 30 and 400 mm, preferably between 40 and 300 mm and more preferably between 80 and 150 mm, and the width of the dimension of the inner surface is between 27 and 397 mm, preferably between 28 and 288 mm and more preferably between 55 and 125 mm. According to the invention the L-profile shaped element includes a first and a second leg, wherein the legs are arranged to have substantially different widths but substantially the same thicknesses. In one embodiment the width of the second leg is 1 to 13.3 times, preferably 1.1 to 7.5 times, more preferably 1.2 to 3 times and most preferably 1.5 to 1.7 times the width of the first leg.

[0011] In one embodiment of the invention the L-profile shaped element is arranged to be joined from the thicknesswise end of at least one leg, which, at the same time,

is the lengthwise face of the L-profile shaped element, by a joint part to at least one other element which may be e.g. another L-profile shaped element or an additional element to be connected to an L-profile shaped element, or another element. In one embodiment the joint part of the thicknesswise end of the leg is shaped for a joint member in order to facilitate the joining e.g. with another L-profile shaped element or another element.

[0012] In one embodiment of the invention a monolithic interior angle is formed without joints between the inner surfaces of the legs. In one embodiment a monolithic exterior angle is formed without joints between the outer surfaces of the legs. This way, the surface is continuous for the part of the entire angular structure which is seamless and safe. In this manner a jointless angular element is provided.

[0013] In one embodiment of the invention the patterning of the legs of the L-profile shaped element is arranged to be at least partially the same, which facilitates turning of the element. Preferably, also the patterning of both sides of the leg is arranged to be at least partially the same. Similar surfaces provide a harmonious look, regardless in which manner and which way around the element is installed. In one embodiment at least part of the surface of the leg is modified, e.g. by grooving. In one embodiment the top surface of the leg is at least partially smooth. In one embodiment the groove patterning or smooth surface provided to the legs is the same, but the area covered by the patterning may vary. The thicknesswise end surfaces of the legs need not be similar to the other side surfaces of the legs.

[0014] In one embodiment of the invention the same surface patterning is provided on both sides of the exterior angle between the legs. In one embodiment of the invention the same surface patterning is provided on both sides of the interior angle between the legs. In one embodiment of the invention the same surface patterning is provided on both sides of the exterior angle and the interior angle between the legs. The surface patterning may vary according to the purpose of use, but preferably all surfaces of all legs have a functionally similar patterning. In one embodiment the leg is provided with a groove-ridge patterning. In one embodiment the leg is provided with a substantially smooth framing area which may serve as a decorative area or border at the edge of the leg. In one embodiment the leg is provided with a groove-ridge patterning to provide the desired functionality to the surface of the leg and a substantially smooth border area and/or angular area to provide a decorative appearance to the surface of the leg. Preferably, the surface patterning is provided to the surface of the leg without any such rises or elevations on which one may stumble or which may affect the safety in stair structures.

[0015] In one embodiment of the invention at least one cavity structure is provided within at least one leg. The cavity structure may consist of one or several cavities, and the cavity may be a channel, opening or other cavity structure. If desired, the cavities may be filled with a suitable material, such as light, elastic, insulating or otherwise suitable material. In one embodiment the cavity is arranged to be elongated in the lengthwise direction of the leg. The cavities provide for control of the weight of the L-profile shaped element. The number or ratio of the cavities relative to the rest of the structure depends on the starting material used and the strength and/or load-carrying capacity desired for the element.

[0016] In one embodiment of the invention a border is provided to at least one lengthwise edge of at least one leg. The lengthwise edge may be the lengthwise outer edge of the leg or the lengthwise inner edge of the leg, i.e. the lengthwise edge forming an angle with another leg. In this case, the up- and/or forward-projecting edge of the rise and the tread of a step to be formed from the elements can be bordered or covered. The width of the border may vary according to the purpose of use. In one preferred embodiment the border is formed in connection with the manufacture of the L-profile shaped element, e.g. by extrusion or an additional extrusion step or alternatively by modifying or patterning the material of the element in a desired area. In one preferred embodiment the border is provided to the L-profile shaped element symmetrically in such a manner that the element looks the same from different sides, when turned to a desired position.

[0017] In one embodiment of the invention a border is provided to at least one edge in the width direction of at least one leg. In one embodiment a profile of a desired shape is used as the border. The border may be formed from the same material or from a different material. The border may be an integral part of the element according to the invention, or it may be separate and joined to the element. The border may serve as a decorative part. In one embodiment the border may be formed in connection with the manufacture of the L-profile shaped element. In one embodiment the border can be joined to the L-profile shaped element after the manufacture of the element or in connection with the installation of the element.

[0018] In one embodiment the L-profile shaped element is formed by a forming method based on heat and pressure.

[0019] In one preferred embodiment the element is formed as a monolithic piece by extrusion.

[0020] In one embodiment the L-profile shaped element is formed from a starting material which contains fiber-based and plastic-based components.

[0021] In one embodiment the L-profile shaped element is formed from a composite material which contains fiber-based components and/or plastic-based components and is used as the starting material. The composite material is formed from one or several raw stocks or raw stock materials. The raw stock or raw stock material may contain any fiber-based, e.g. plant fiber -based, such as wood fiber, straw, reed or flax-based, or other fiber-based components and/or plastic-based components. The composite material may be in a shredded, granulate, agglomerate, crushed or equivalent form.

[0022] In one embodiment the composite material is a wood-plastic composite material. Preferably, the wood-plastic composite material is formed from raw stocks which contain mainly fiber-based, e.g. paper-based, material, and plastic-based material, such as thermosetting or thermoplastic resin.

[0023] In this context a paper-based material means any paper-based material which is preferably mainly formed from plant fibers. The paper-based material may be formed from chemical pulp fibers from which lignin has been removed and/or from fibers which contain lignin. In a preferred embodiment the paper-based material contains plant fibers in an amount of more than 50 w-% of the material.

[0024] In one embodiment the parts of the fiber-based components may vary between 0 and 80 % and the parts of the plastic-based components may vary between 0 and 100 % in the composite material.

[0025] In one embodiment the composite material contains glue matter preferably originating from the raw stock of the composite material.

[0026] In one embodiment the raw stock or raw stocks contain siliconized material, e.g. siliconized film or paper material. The siliconized material may be silicone-based or silicone compound -based material or silicone-containing compound that may be part of another material or provided to the surface of another material, such as plastic-based and/or fiber-based material.

[0027] In one embodiment the L-profile shaped element is formed at least partially from recycled material. In one embodiment the L-profile shaped element is formed mainly from recycled material.

[0028] In one embodiment the L-profile shaped element is formed at least partially from adhesive laminate waste, in one preferred embodiment mainly, in an amount of more than 50 w-%, from adhesive laminate waste. In one embodiment the L-profile shaped element contains at least one adhesive laminate waste component. In one embodiment the L-profile shaped element contains more than one adhesive laminate waste component.

[0029] In one embodiment the adhesive laminate waste contains adhesive material on which a layer of glue matter has been provided, and fitted on the layer of glue matter as a protective sheet for the layer of glue is release material that can be easily released at the application site of the adhesive item. In one preferred embodiment the adhesive material and/or the release material contains a wood fiber -based component and/or plastic- or polymer-based or other organic component. Also, the use of different inorganic materials is possible. In one embodiment the adhesive and/or release material is wood fiber -based paper, paperboard or the like. In one embodiment the wood fiber -based paper, paperboard or the like contains or is treated with plastic- or polymer-based material. In one embodiment the adhesive and/or release material may substantially be formed from plastic- or polymer-based material. In one embodiment the release material is mainly formed from plastic-based material, containing e.g. polypropylene, polyethylene, polyethylene terephthalate or their mixtures. In one embodiment the release material contains siliconized material, e.g. siliconized film or fiber-based material. In one embodiment the release material is coated with silicone-based material or compound.

[0030] In one embodiment finished adhesive laminate products, waste material produced by them and/or in their manufacture may be used as adhesive laminate waste in the manufacture of the composite material. In addition, reject material from production and recycling material from the upgrading step or end use applications of adhesive laminate products may be used. In one embodiment the adhesive laminate waste comes from adhesive laminate production which mainly produces production reject waste, edge trimming waste cut off from rolls, and roll ends, from the adhesive laminate printing plant which mainly produces roll ends and adhesive material left over from die-cutting of stickers and labels, and reject waste, and/or from the adhesive laminate end user customer who pastes the printed stickers and labels or the like on products. The waste from the end user is mainly release material, roll ends and waste from the finished product.

[0031] In one embodiment the adhesive laminate waste may contain a variable number of different adhesive laminate waste components, such as adhesive material, glue matter and release material. The glue matter may preferably be in connection with adhesive material and/or release material. In one embodiment the adhesive laminate waste contains 0 to 70 % of adhesive material, 0 to 100 % of release material and 0 to 40 % of glue matter.

[0032] In one embodiment the starting material, e.g. the composite material, may contain, in addition to plastic-based and/or fiber-based components, different additives and/or additional plastic to improve the mechanical properties, outdoor durability or processability of the product.

[0033] In one embodiment at least one additive is added to the starting material, e.g. the composite material, in connection with the manufacture of the composite material or in connection with the manufacture of the L-profile shaped element. E.g. a coloring agent, lubricant, fire retardant, adhesion promoter, anti-mildew compound, antioxidant and uv-stabilizer may be used as additives. Fibrous materials, organic fillers, inorganic fillers, powdery reinforcements, powdery additives, talc, wood fibers, chemical pulp fibers, paper and their combinations may preferably be added to the composite material as the additive.

[0034] In one embodiment additional plastic is added to the starting material, e.g. the composite material, in connection with the manufacture of the composite material or in connection with the manufacture of the L-profile shaped element. Virgin plastic and/or recycling plastic may be used as additional plastic. The L-profile shaped element may be manufactured without additional plastic or with additional plastic. In one embodiment e.g. poly-

olefin, polypropylene, polyethylene (HDPE, LDPE) or other suitable plastic or a mixture thereof is added to the adhesive laminate waste material as additional plastic to manufacture the wood composite material.

[0035] Preferably, the L-profile shaped element is formed by extrusion. In one embodiment the L-profile shaped element is cooled after compressing to shape in connection with or after the extrusion. The extrusion may be performed by any manner and apparatus known per se. According to the invention the L-profile shaped element is used together with another L-profile shaped element in order to form a step such that the L-profile shaped elements form together the rise part of the step. In one embodiment the L-profile shaped element forms both the rise part of the step as well as the tread.

[0036] In addition, the invention relates to a method for installing the stair structure. According to the invention at least two L-profile shaped elements according to any of the descriptions presented above are fitted and joined in a position relative to each other as required by the purpose of use by means of joint parts provided to the edges of the legs, wherein all joint parts function substantially in the same manner. The joints between the elements are provided in stair embodiments in the rise or the step part of the stair, not at the corners.

[0037] In one embodiment of the invention at least one additional element is fitted and joined between the L-profile shaped elements.

[0038] An additional element in this context means an elongated element, such as a plank-like, board-like or correspondingly shaped element, or a slab-like element or an element having another shape. The additional element may be two- or three-dimensional. The plank-like element may be formed e.g. as a rectangle, elongated parallelogram, square or the like. The additional element may be of any size depending on the purpose of use. Preferably, the dimensions of the additional element are such that it is compatible with the L-profile shaped element according to the invention. In one preferred element the thickness of the additional element is substantially the same as the thickness of the legs of the L-profile shaped element. In one embodiment the additional element is substantially equally long as the L-profile shaped element.

[0039] In one embodiment the additional element is formed from any of the composite materials presented above. Alternatively, the additional element is formed from another material suitable for the purpose of use. According to the invention the L-profile shaped element according to any of the descriptions presented above is fitted and joined from the thicknesswise end of at least one leg to at least one other L-profile shaped element and/or to at least one additional element.

[0040] In one embodiment of the invention the L-profile shaped element is fitted as the interior angle of an angular structure of the stair structure. In one embodiment of the invention the L-profile shaped element is fitted as the exterior angle of an angular structure.

[0041] In addition, the invention relates to a method for installing the stair structure.

[0042] In one embodiment the L-profile shaped elements can be joined to each other, and the L-profile shaped element and an additional element or other element can be joined together by different joint members, e.g. T-joint members or joint profiles. A joint member in this context means a joint and/or mounting member. Any joint member or joint profile known per se and suitable for the purpose can be used as the joint member. The joint profile may be e.g. the joint profile disclosed in applications PCT/FI2010/051100 and PCT/FI2010/050703. Preferably, the L-profile shaped elements, additional elements or other elements to be used are made compatible with the joint members used. In one embodiment the end of at least one leg of the L-profile shaped element is so shaped that a concealed fixing is provided by the joint member.

[0043] In one embodiment the L-profile shaped element is mountable, e.g. to a base, by nailing or screwing or in an equivalent manner. In one embodiment the L-profile shaped element is provided with a site or location e.g. to facilitate the possible nailing-through or screwing-through.

[0044] In one embodiment the surface of the L-profile shaped element and/or additional element is provided coarse or grooved to provide friction. In one embodiment the surface of the L-profile shaped element and/or additional element is provided substantially smooth. The L-profile shaped element or the surface thereof may be shaped so as to also function as a decorative part.

[0045] The L-profile shaped element may be used in connection with stair structures in both interior and exterior applications. In addition, the L-profile shaped element can be used in forming e.g. benches, flower boxes or equivalent structures. The L-profile shaped element can be used in assembled and disassembled structures or in fixed structures. A desired type of a stair structure or terrace structure can be formed either by using the L-profile shaped elements alone or together with different additional elements. By using different colors on the additional elements and/or L-profile shaped elements, different patterns can be created on the surface.

[0046] An advantage of the L-profile shaped element according to the invention is that it is turnable around freely, and thereby e.g. different rise heights and runs can be provided for stair structures.

[0047] The L-profile shaped element can be manufactured easily and quickly in a single manufacturing step, e.g. extrusion step. One and the same extrusion apparatus can be used to manufacture an extensive range of unlike L-profile shaped elements.

LIST OF FIGURES

[0048]

Fig. 1 illustrates one L-profile shaped element for

use in the stair structure according to the invention as a cross-sectional view,

Fig. 2a illustrates one L-profile shaped element for use in the stair structure according to the invention,

Fig. 2b illustrates another L-profile shaped element for use in the stair structure according to the invention,

Fig. 3 illustrates one stair structure according to the invention formed from the L-profile shaped elements as a cross-sectional view,

Fig. 4 illustrates a second stair structure according to the invention formed from the L-profile shaped elements as a cross-sectional view,

Fig. 5 illustrates a third stair structure according to the invention formed from the L-profile shaped elements as a cross-sectional view with additional elements provided between the L-profile shaped elements, and

Fig. 6 illustrates a terrace structure formed from the L-profile shaped elements including the joints.

DETAILED DESCRIPTION OF THE INVENTION

[0049] In the following, the invention will be described by detailed examples of its embodiments with reference to the accompanying, illustrative figures wherein the L-profile shaped elements and additional elements are not depicted fully on scale.

Example 1

[0050] The L-profile shaped element 1 illustrated in Fig. 1 and 2a was formed from a wood-plastic composite material. The wood-plastic composite material was mainly formed from adhesive laminate waste. Polypropylene had been added to the adhesive laminate waste. The L-profile shaped element was formed as a monolithic piece by extrusion.

[0051] The L-profile shaped element 1 according to Fig. 1 and 2a includes a first 2 and a second 3 leg, wherein the legs are arranged to have different widths 6 but the same thicknesses 7. The thickness 7 of the legs 2 and 3 is 28mm in this embodiment. In this embodiment the width of the outer surface b of the leg in the first leg 2 is 68mm and the width of the inner surface d is 40mm. The width of the outer surface a of the leg in the second leg 3 is 110mm and the width of the inner surface c is 82mm. The length 5 of the L-profile shaped element 1 may vary depending on the purpose of use of the element.

[0052] An interior angle 14 and an exterior angle 15 are formed between the legs 2 and 3.

[0053] Within the legs 2 and 3 there are provided elongated cavity structures 4 fitted in the lengthwise direction 5 of the legs and, at the same time, in the lengthwise direction of the L-profile shaped element. The cavity structure consists of several channel-type cavities 4. The cross section of the cavities 4 is otherwise square but at the corners at least partially triangular or trapezoidal. By the cavities, the weight of the L-profile shaped element may be reduced. The thickness of the structures between the cavities 4 and of the structures on top of the cavities 4 depends on the purpose of use of the element. The thickness of the structures between the cavities 4 and of the structures on top of the cavities 4 is dimensioned in such a way that the structures bear a sufficient load during use of the element and will not sag. In this embodiment the thickness of the structures between the cavities 4 and of the structures on top of the cavities 4 is at least 2mm. The diameter of the cavities may be preferably between 3 and 12 mm.

[0054] The thicknesswise ends 7 of the legs 2 and 3, i.e. the lengthwise faces of the L-profile shaped element, are shaped for a joint member. A groove-type structure has been provided to the ends 7 as the joint part 13 of the element. This way, the joint member can be easily fitted in connection to the L-profile shaped element, the element can be easily turned around, and the joint member provides a concealed fixing, providing for a finished appearance.

[0055] If desired, borders may be provided to the lengthwise 5 edges of the legs of the L-profile shaped element 1, preferably in such a way that in turning the element around it is symmetrical for the part of the borders. Any suitable profile may be used as a border. Alternatively, the border may be formed by extrusion at the same time in connection with the manufacture of the L-profile shaped element as an integral part of the L-profile shaped element.

[0056] All the top surfaces of the first 2 and the second 3 leg of the L-profile shaped element 1, i.e. the widthwise 6 outer and inner surfaces a, b, c and d, are profiled to be identical by grooving. This provides similar functionality for all surfaces of each leg 2 and 3. This favors the turning around of the element. In particular, a groove-ridge structure 17 improves the frictional properties of the element and thus functions as a frictional area. The edges of the element 1 and particularly of the legs 2 and 3 are provided with decorative areas 16a and 16b. The outer edges of the legs 2 and 3 on both sides of the legs are provided with smooth, decorative framing areas 16a, all of which are substantially of the same width. The interior 14 and exterior 15 angles between the legs are also provided with smooth decorative areas 16b. By means of the decorative areas 16a and 16b the element can be better turned around in such a way that the element 1 looks symmetrical on both sides. The L-profile shaped element 1 is turnable to the desired position when the element is being used e.g. in a stair structure or in connection with a terrace structure, as seen in Fig. 3 to 6.

[0057] Fig. 2b illustrates an element equivalent to Fig. 1 and 2a with the exception that the element in Fig. 2b has a first 2 and a second 3 leg, wherein the legs are arranged to have substantially the same widths 6 and the same thicknesses 7.

Example 2

[0058] Fig. 3 illustrates a stair structure formed from the L-profile shaped elements 1 according to Example 1.

[0059] The L-profile shaped elements 1 according to Example 1 are fitted in predetermined positions, in this case alternately both ways around in order to achieve an optimum rise and optimum run for the steps of the stair structure of this embodiment. The L-profile shaped element 1 forms together with another L-profile shaped element 1 the rise part 11 of the step and the tread 12.

[0060] Each L-profile shaped element is arranged to be joined from at least one thicknesswise end 7 of the leg to at least one thicknesswise end of the leg of another L-profile shaped element.

[0061] The joints between the elements are provided to the middle of the tread 12 or the rise part 11.

Example 3

[0062] Fig. 4 illustrates a stair structure formed from the L-profile shaped elements 1 according to Example 1.

[0063] The L-profile shaped elements 1 according to Example 1 are fitted in predetermined positions, in this case alternately both ways around in order to achieve the optimum rise and optimum run for the steps of the stair structure of this embodiment. The L-profile shaped element 1 forms together with another L-profile shaped element 1 the rise part 11 of the step and the tread 12.

[0064] Each L-profile shaped element is arranged to be joined from at least one thicknesswise end of the leg to at least one thicknesswise end of the leg of another L-profile shaped element.

[0065] The joints between the elements are provided to the middle of the tread 12 or the rise part 11.

Example 4

[0066] Fig. 5 illustrates a stair structure formed from the L-profile shaped elements 1 according to Example 1 wherein additional elements 8 have been provided between the L-profile shaped elements 1.

[0067] The additional elements used in this connection are elongated planks 8 formed substantially from the same wood-plastic composite material as the L-profile shaped elements 1.

[0068] The plank 8 is equally thick as the first 2 and the second 3 leg of the L-profile shaped element 1. The length of the plank is equal to the length of the L-profile shaped element. The width of the plank in this embodiment is 150mm. The width of the plank may vary between 50 and 400 mm, more preferably between 100 and 200 mm. Preferably, the thickness of the plank is substantially the same as that of the L-profile shaped element.

[0069] The L-profile shaped elements 1 according to Example 1 are fitted in predetermined positions and joined from at least one thicknesswise end of the leg to at least one thicknesswise end of another element which is either another L-profile shaped element 1 or the additional element 8. The L-profile shaped element 1 forms together with another L-profile shaped element 1 the rise part 11 of the step and together with the plank 8 the tread 12. The joints between the elements are provided in connection to the tread 12 or the rise part 11, not on the corners.

Example 5

[0070] Fig. 6 illustrates a terrace structure formed from the L-profile shaped element 1 according to Example 1 and the planks 8 according to Example 4 including the joints between the elements.

[0071] The L-profile shaped element 1 and the planks 8 are joined together by joint members 9. Any suitable joint member may be used as a joint member. The joint members according to Fig. 6 have a tongue-type structure matching to the groove-type structures of the L-profile shaped element 1 and the plank 8. In the structure according to Fig. 6 a base element 10 can be used to support the L-profile shaped element 1 and the entire construction. In addition, the L-profile shaped element 1 can be secured to the base element 10 by e.g. screws or nails, if desired.

[0072] The L-profile shaped element 1 can be used to cover the edge of a terrace structure formed from planks 8, thus providing to the terrace structure a neat external appearance.

[0073] The L-profile shaped element according to the invention is used in stair structure solutions, alone or together with different additional elements.

[0074] The invention is not limited merely to the examples referred to above; instead, many variations are possible within the scope of the invention defined by the claims.

Claims

1. A stair structure comprising a plurality of L-profile shaped elements,

   - each L-profile shaped element being formed as a monolithic piece,
   - each L-profile shaped element being formed from a composite material, which contains fiber-based components and/or plastic-based components, and which is used as the starting material,
   - each L-profile shaped element (1) includes a first leg (2) and a second (3) leg, wherein dimensions of the L-profile shaped element (1) being length, width and thickness of the first leg (2) and the second leg (3),
   - wherein joint parts (13) are fitted to the edges in the thickness direction of the first leg (2) and the second leg (3), the joint parts (13) being to

function in the same manner in the interior as well as exterior of the L-profile shaped element, regardless which way around the L-profile shaped element (1) has been turned,
- the joint parts (13) being selected from a groove or tongue structure,
- each L-profile shaped element (1) being arranged to be joined from the thicknesswise end (7) of at least one of the first leg (2) and the second leg (3), which is at the same time the lengthwise face of the L-profile shaped element (1), to at least one other L-profile shaped element of the same type by means of the joint parts (13),

characterized in that

- the first leg (2) and the second leg (3) being arranged to have substantially the same thicknesses and to have substantially different widths,
- each L-profile shaped element (1) being turnable to a desired position such that a plurality of such L-profile shaped elements are adapted to be fitted in a predetermined positions alternately both ways around, the rise part (11) of a step of said stair structure being formed by a said L-profile shaped element (1) being joined from at least one thicknesswise end (7) of a leg to at least one thicknesswise end (7) of a leg of another said L-profile shaped element (1), the external surfaces of these two L-profile shaped elements being adjacent to each other so that the joint between these two elements is provided to the middle of the rise part (11).

2. A stair structure according to claim 1, **characterized in that** each L-profile shaped element (1) is adapted to be connected to an additional element.

3. A stair structure according to claim 1 or 2 **characterized in that** a monolithic interior angle (14) is formed without joints between the inner surfaces of the first leg (2) and the second leg (3).

4. A stair structure according to any one of claims 1 to 3, **characterized in that** a monolithic exterior angle (15) is formed without joints between the outer surfaces of the first leg (2) and the second leg (3).

5. A stair structure according to any one of claims 1 to 4, **characterized in that** an identical surface pattern is provided on both sides of the interior angle (14) between the first leg (2) and the second leg (3).

6. A stair structure according to any one of claims 1 to 5, **characterized in that** an identical surface pattern is provided on both sides of the exterior angle (15) between the first leg (2) and the second leg (3).

7. A stair structure according to any one of claims 1 to 6, **characterized in that** the surfaces of the first leg (2) and the second leg (3) are provided with a surface patterning (17) to provide functionality.

8. A stair structure according to any one of claims 1 to 7, **characterized in that** at least one cavity structure (4) is provided within at least one of the first leg (2) and the second leg (3).

9. A stair structure according to any one of claims 1 to 8, **characterized in that** at least one lengthwise edge (5) of at least one of the first leg (2) and the second leg (3) is provided with a border.

10. A stair structure according to any one of claims 1 to 9, **characterized in that** each L-profile shaped element (1) is formed as a monolithic piece by extrusion.

11. A stair structure according to any one of claims 1 to 10, **characterized in that** each L-profile shaped element (1) is formed from the starting material to which an additive and/or a plastic has been added.

12. A method for installing a stair structure, **characterized in that** the method comprises fitting and joining at least two L-profile shaped elements (1) of a stair structure according to any of the claims 1-11.

13. The method according to claim 12, **characterized in that** it further comprises fitting and joining at least one additional element (8) to at least one of the L-profile shaped elements (1).

Patentansprüche

1. Treppenkonstruktion, umfassend eine Mehrzahl von Elementen in der Form von L-Profilen,

- wobei jedes Element in der Form eines L-Profils als monolithisches Teil ausgebildet ist,
- wobei jedes Element in der Form eines L-Profils aus einem Verbundmaterial gebildet ist, das Komponenten auf Faserbasis und/oder Komponenten auf Kunststoffbasis enthält und das als Ausgangsmaterial verwendet wird,
- wobei jedes Element in der Form eines L-Profils (1) einen ersten Schenkel (2) und einen zweiten (3) Schenkel aufweist, wobei die Abmessungen des Elements in der Form eines L-Profils (1) die Länge, Breite und Dicke des ersten Schenkels (2) und des zweiten Schenkels (3) sind,
- wobei Verbindungsteile (13) an den Kanten in der Dickenrichtung des ersten Schenkels (2)

und des zweiten Schenkels (3) angeordnet sind, wobei die Verbindungsteile (13) in der gleichen Weise im Inneren wie auch Äußeren des Elements in der Form eines L-Profils wirken, unabhängig davon, in welcher Weise das Element in der Form eines L-Profils (1) gedreht worden ist,
- wobei die Verbindungsteile (13) aus einer Nut- oder Zungenstruktur ausgewählt sind,
- wobei jedes Element in der Form eines L-Profils (1) derart ausgebildet ist, dass es mit dem dickenseitigen Ende (7) des ersten Schenkels (2) und/oder des zweiten Schenkels (3), das gleichzeitig die längs weisende Fläche des Elements in der Form eines L-Profils (1) ist, mittels der Verbindungsteile (13) mit mindestens einem weiteren Element in der Form eines L-Profils des gleichen Typs verbunden ist,

dadurch gekennzeichnet, dass

- der erste Schenkel (2) und der zweite Schenkel (3) derart ausgebildet sind, dass sie im Wesentlichen die gleichen Dicken und im Wesentlichen verschiedene Breiten aufweisen,
- jedes Element in der Form eines L-Profils (1) in eine gewünschte Position umdrehbar ist, so dass eine Mehrzahl von derartigen Elementen in der Form von L-Profilen dazu ausgebildet sind, in vorausbestimmten Positionen abwechselnd umgedreht angeordnet zu werden,
- der Höhenteil (11) einer Stufe der Treppenkonstruktion durch ein derartiges Element in der Form eines L-Profils (1) gebildet ist, das an mindestens einem dickenseitigen Ende (7) eines Schenkels mit mindestens einem dickenseitigen Ende (7) eines Schenkels eines weiteren derartigen Elements in der Form eines L-Profils (1) verbunden ist, wobei die Außenflächen dieser beiden Elemente in der Form von L-Profilen derart aneinander angrenzend angeordnet sind, dass die Verbindung zwischen diesen beiden Elementen in der Mitte des Höhenteils (11) vorgesehen ist.

2. Treppenkonstruktion nach Anspruch 1, **dadurch gekennzeichnet, dass** jedes Element in der Form eines L-Profils (1) dazu ausgebildet ist, mit einem zusätzlichen Element verbunden zu werden.

3. Treppenkonstruktion nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** ein monolithischer Innenwinkel (14) ohne Verbindungen zwischen den Innenflächen des ersten Schenkels (2) und des zweiten Schenkels (3) gebildet ist.

4. Treppenkonstruktion nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** ein monolithischer Außenwinkel (15) ohne Verbindungen zwischen den Außenflächen des ersten Schenkels (2) und des zweiten Schenkels (3) gebildet ist.

5. Treppenkonstruktion nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** ein identisches Flächenmuster auf beiden Seiten des Innenwinkels (14) zwischen dem ersten Schenkel (2) und dem zweiten Schenkel (3) vorgesehen ist.

6. Treppenkonstruktion nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** ein identisches Flächenmuster auf beiden Seiten des Außenwinkels (15) zwischen dem ersten Schenkel (2) und dem zweiten Schenkel (3) vorgesehen ist.

7. Treppenkonstruktion nach einem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** die Flächen des ersten Schenkels (2) und des zweiten Schenkels (3) mit einer Flächenstrukturierung (17) versehen sind, um Funktionsfähigkeit sicherzustellen.

8. Treppenkonstruktion nach einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass** mindestens eine Hohlkammerstruktur (4) innerhalb des ersten Schenkels (2) und/oder des zweiten Schenkels (3) vorgesehen ist.

9. Treppenkonstruktion nach einem der Ansprüche 1 bis 8, **dadurch gekennzeichnet, dass** mindestens eine längs weisende Kante (5) des ersten Schenkels (2) und/oder des zweiten Schenkels (3) mit einer Randleiste versehen ist.

10. Treppenkonstruktion nach einem der Ansprüche 1 bis 9, **dadurch gekennzeichnet, dass** jedes Element in der Form eines L-Profils (1) durch Extrudieren als monolithisches Teil ausgebildet ist.

11. Treppenkonstruktion nach einem der Ansprüche 1 bis 10, **dadurch gekennzeichnet, dass** jedes Element in der Form eines L-Profils (1) aus dem Ausgangsmaterial gebildet ist, dem ein Zusatzstoff und/oder ein Kunststoff zugesetzt worden ist.

12. Verfahren zum Einbau einer Treppenkonstruktion, **dadurch gekennzeichnet, dass** das Verfahren das Anordnen und Verbinden von mindestens zwei Elementen in der Form von L-Profilen (1) einer Treppenkonstruktion nach einem der Ansprüche 1 bis 11 umfasst.

13. Verfahren nach Anspruch 12, **dadurch gekennzeichnet, dass** es ferner das Anordnen und Verbinden mindestens eines zusätzlichen Elements (8) mit mindestens einem der Elemente in der Form von L-Profilen (1) umfasst.

Revendications

1. Structure d'escalier comprenant une pluralité d'éléments profilés en L,

- chaque élément profilé en L étant formé comme une pièce monolithique,
- chaque élément profilé en L étant formé d'un matériau composite, qui contient des composants à base de fibres et/ou des composants à base de plastique et qui est utilisé comme matériau de départ,
- chaque élément profilé en L(1) comprend un premier montant (2) et un deuxième (3) montant, dans lequel les dimensions de l'élément profilé en L (1) étant la longueur, la largeur et l'épaisseur du premier montant (2) et du deuxième montant (3),
- dans lequel les pièces d'assemblage (13) prennent place aux arêtes dans le sens de l'épaisseur du premier montant (2) et du deuxième montant (3), les pièces d'assemblage (13) étant censées opérer de la même manière à l'intérieur comme à l'extérieur de l'élément profilé en L, quelle que soit la manière dont l'élément profilé en L (1) est tourné,
- les pièces d'assemblage (13) étant sélectionnées parmi une structure en rainure ou languette,
- chaque élément profilé en L (1) étant agencé pour être assemblé sur base de son épaisseur d'extrémité (7) d'au moins l'un du premier montant (2) et du deuxième montant (3), lequel est en même temps la face de longueur de l'élément profilé en L (1) par rapport à au moins un autre élément profilé en L du même type au moyen des pièces d'assemblage (13),

caractérisé en ce que

- le premier montant (2) et le deuxième montant (3) sont agencés pour avoir essentiellement la même épaisseur et pour présenter des largeurs essentiellement différentes,
- chaque élément profilé en L (1) pouvant être tourné à une position souhaitée de sorte qu'une pluralité d'éléments profilés en L de ce type sont propres à prendre place dans une position prédéterminée en alternance dans les deux sens, la partie montante (11) d'une marche de ladite structure d'escaliers étant formée par un dit élément profilé en L (1) étant assemblé à partir d'au moins une épaisseur d'extrémité (7) d'un montant à au moins une épaisseur d'extrémité (7) d'un montant de l'autre dit élément profilé en L (1), les surfaces externes de ces deux éléments profilés en L étant adjacents l'un à l'autre de sorte que l'assemblage entre ces deux éléments est prévu au centre de la partie montante (11).

2. Structure d'escalier selon la revendication 1, **caractérisée en ce que** chaque élément profilé en L(1) est propre à être raccordé à un élément supplémentaire.

3. Structure d'escalier selon la revendication 1 ou 2, **caractérisée en ce qu'**un angle intérieur monolithique (14) se forme sans joints entre les surfaces intérieures du premier montant (2) et du deuxième montant (3).

4. Structure d'escalier selon l'une quelconque des revendications 1 à 3, **caractérisé en ce qu'**un angle extérieur monolithique (15) se forme sans joints entre les surfaces extérieures du premier montant (2) et du deuxième montant (3).

5. Structure d'escalier selon l'une quelconque des revendications 1 à 4, **caractérisée en ce qu'**un motif superficiel identique est prévu sur les deux côtés de l'angle intérieur (14) entre le premier montant (2) et le deuxième montant (3).

6. Structure d'escalier selon l'une quelconque des revendications 1 à 5, **caractérisée en ce qu'**un motif superficiel identique est prévu sur les deux côtés de l'angle extérieur (15) entre le premier montant (2) et le deuxième montant (3).

7. Structure d'escalier selon l'une quelconque des revendications 1 à 6, **caractérisée en ce que** les surfaces du premier montant (2) et du deuxième montant (3) sont munies d'un motif superficiel (17) pour procurer une fonctionnalité.

8. Structure d'escalier selon l'une quelconque des revendications 1 à 7, **caractérisée en ce qu'**au moins une structure en cavité (4) est prévue à l'intérieur d'au moins l'un du premier montant (2) et du deuxième montant (3).

9. Structure d'escalier selon l'une quelconque des revendications 1 à 8, **caractérisée en ce qu'**au moins une arête longitudinale (5) d'au moins l'un du premier montant (2) et du deuxième montant (3) est prévue avec un bord.

10. Structure d'escalier selon l'une quelconque des revendications 1 à 9, **caractérisée en ce que** chaque élément profilé en L (1) est formé par extrusion comme une pièce monolithique.

11. Structure d'escalier selon l'une quelconque des revendications 1 à 10, **caractérisée en ce que** chaque élément profilé en L (1) est formé à partir du matériau de départ auquel un additif et/ou un plastique a été

ajouté.

12. Procédé d'installation d'une structure d'escalier, **caractérisé en ce que** le procédé comprend la mise en place et l'assemblage d'au moins deux éléments profilés en L(1) d'une structure d'escalier selon l'une quelconque des revendications 1 à 11.

13. Procédé selon la revendication 12, **caractérisé en ce qu'**il comprend en outre la mise en place et l'assemblage d'au moins un élément supplémentaire (8) à au moins un des éléments profilés en L (1).

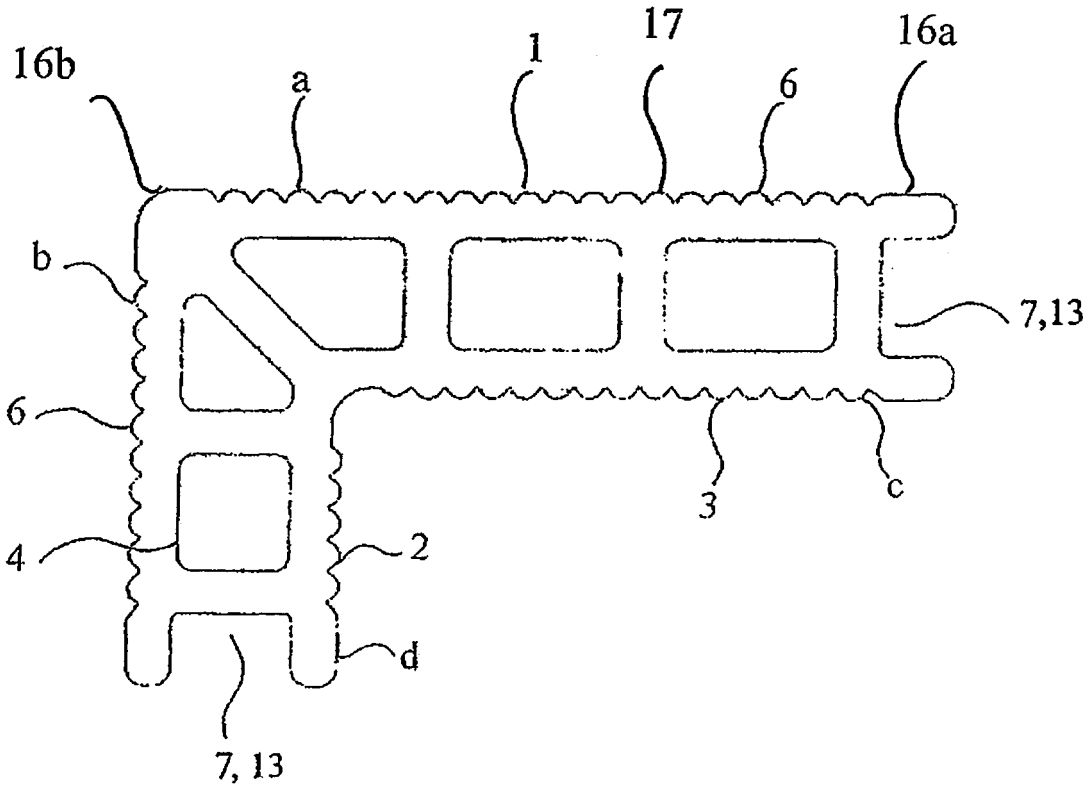


Fig. 1

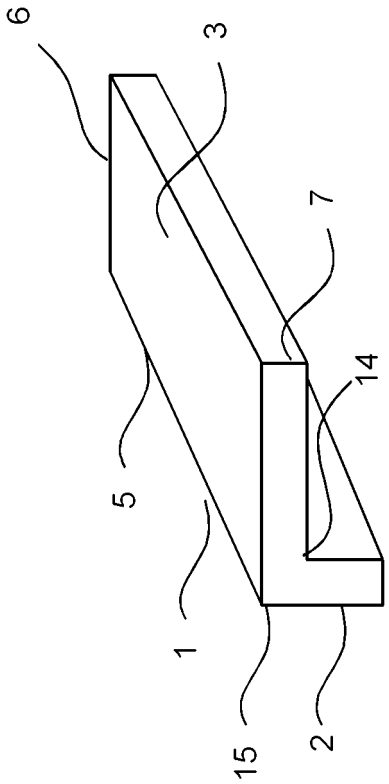


Fig. 2a

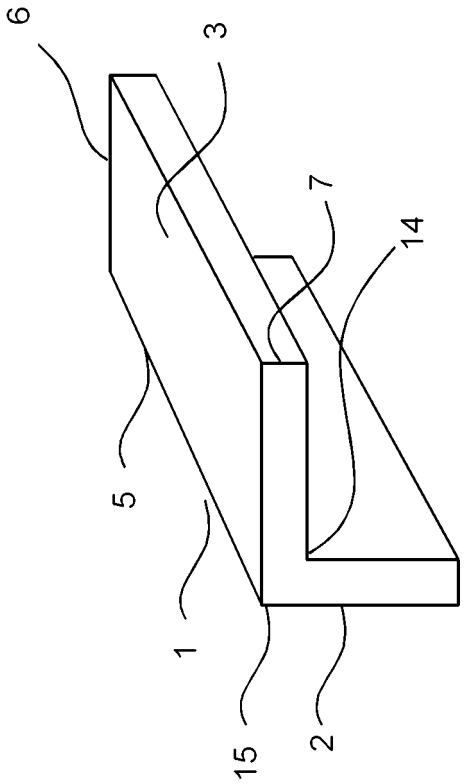


Fig. 2b

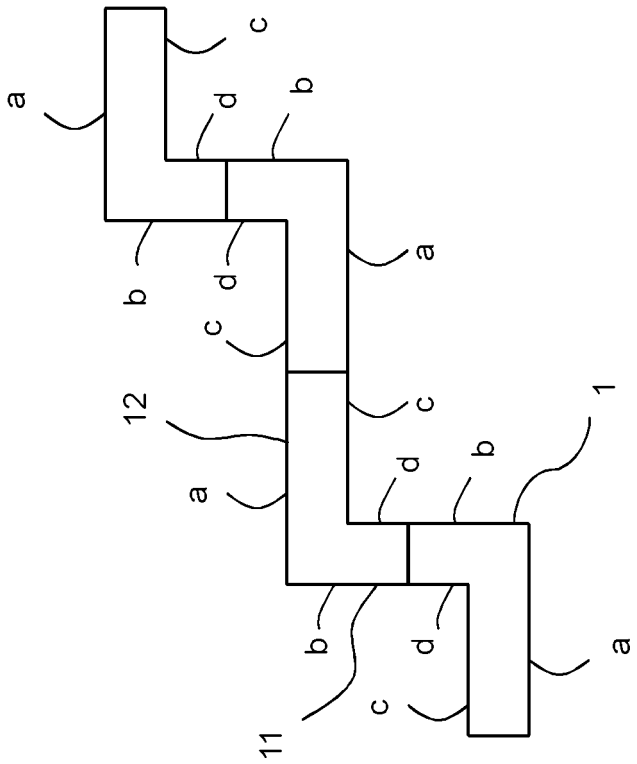


Fig. 3

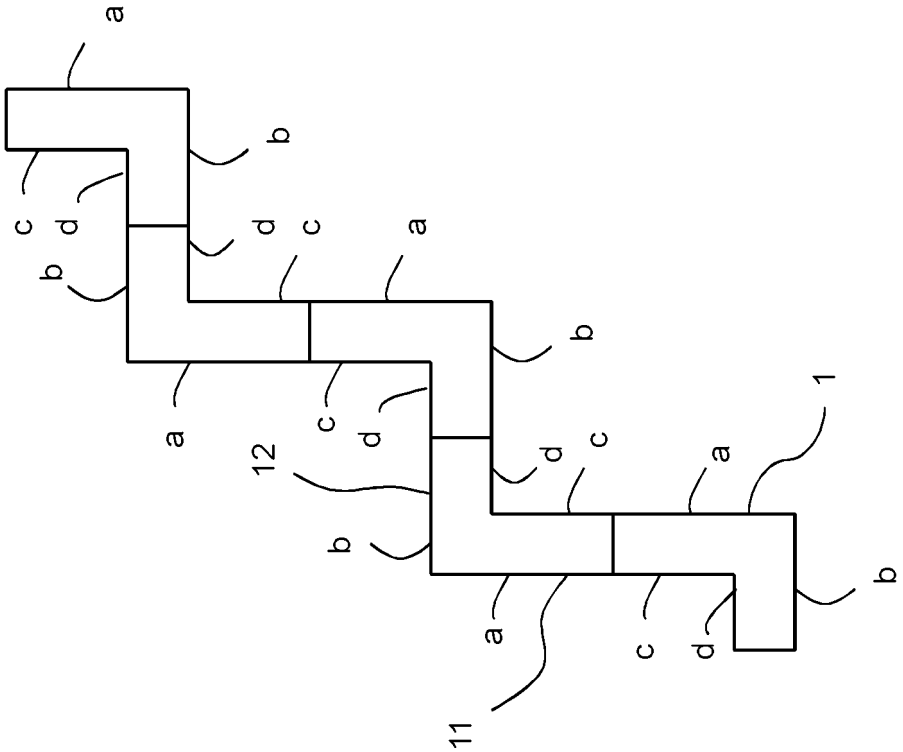


Fig. 4

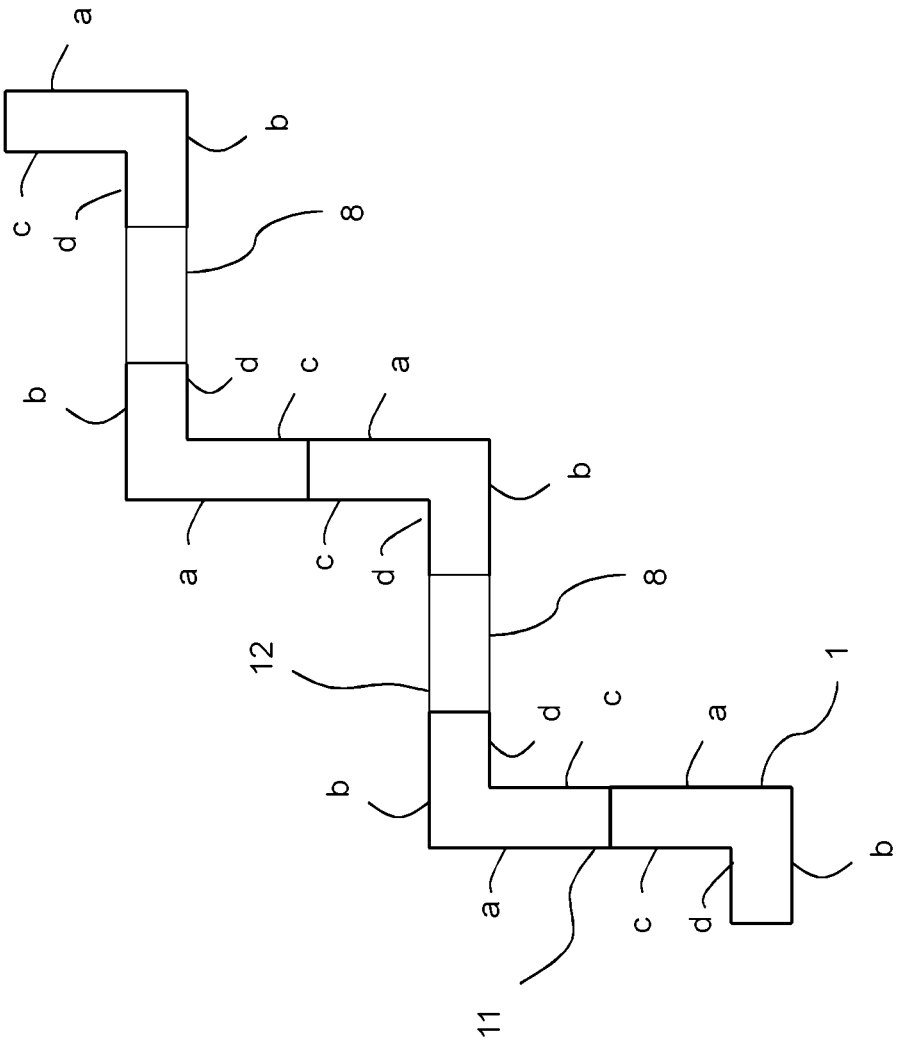


Fig. 5

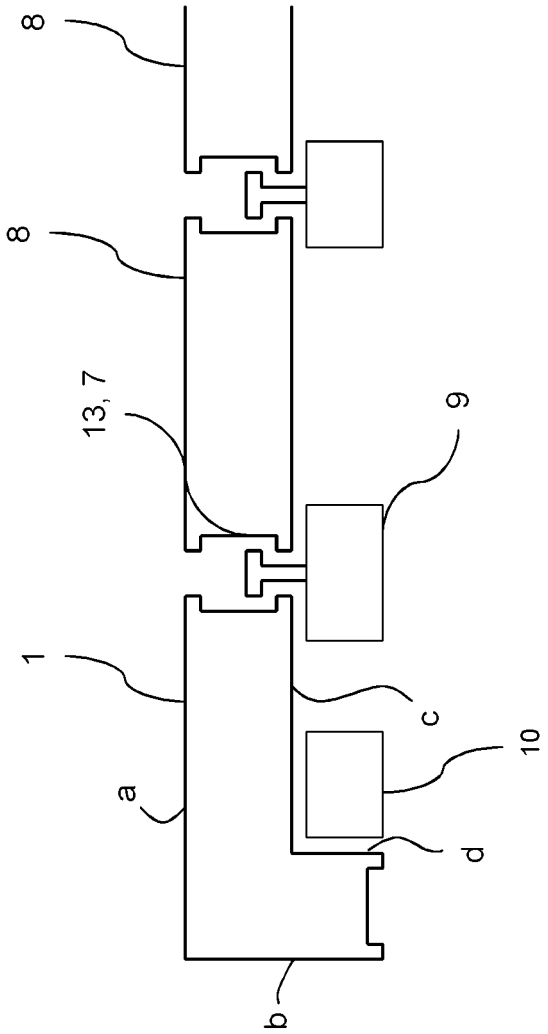


Fig. 6

REFERENCES CITED IN THE DESCRIPTION

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