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(54) **Method for manufacturing a string of a staircase, method for manufacturing a staircase and thus manufactured stair string and staircase**

(57) The invention relates to a method for manufacturing a string of a staircase comprising the method steps of:

- a) manufacturing a template (4) for the stair string, which template forms a vertical projection onto a horizontal plane of the stair string in the situation of use;
- b) manufacturing structural parts (10) from a substantially form-retaining plate material, wherein the structural parts correspond with segments of the template in a manner such that successive structur-

al parts form at least partly overlapping segments of the template, and
c) joining together the structural parts successively in stacked manner.

The invention also relates to a string (14,15) of a staircase manufactured from a number of structural parts (10) assembled in stacked manner, which structural parts consist of at least substantially form-retaining parts of plate material.

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Description

[0001] The invention relates to a method for manufacturing a string of a staircase and to a method for manufacturing a staircase with at least one string manufactured with the method. The invention further relates to a thus manufactured stair string and staircase.

[0002] The construction of staircases for buildings has heretofore been a process entailing traditional craftsmanship, at least when the staircase is one with non-standard dimensions. The basic components of a staircase are the treads, the risers and the strings in which the treads are fixed by means of housings. The stair strings in particular can take very complex spatial forms. An example hereof is a staircase with a landing in which more or less straight parts of the strings are alternated with curve or wreath pieces. Even greater freedom in the design of a staircase can result in still further complexity in the form of for instance spatially twisted stair strings. Parts of stair strings with a complex form (for instance the above mentioned curve or wreath pieces) have heretofore been manufactured by releasing a part with the desired shape from a solid piece of wood using projections. The wood used for this purpose preferably contains no knots or knurls and is straight-grained. The techniques employed according to the prior art are: sawing, planing, cutting and so on. A drawback of the existing method is that the manufacture of more complex workpieces is limited to only very skilled staircase builders. In addition, the existing art is comparatively costly due to material consumption, and particularly the man-hours required.

[0003] The object of the present invention is to provide improved methods of manufacturing stair strings and staircases, with which very complex spatial forms can also be made in efficient manner. It is a further object to provide a stair string and a staircase which can be manufactured in any desired form at limited cost.

[0004] The invention provides for this purpose a method for manufacturing a string of a staircase, comprising the method steps of: a manufacturing a template for the stair string, which template forms a vertical projection onto a horizontal plane of the stair string in the situation of use; b manufacturing structural parts from a substantially form-retaining plate material, wherein the structural parts correspond with segments of the template in a manner such that successive structural parts form at least partly overlapping segments of the template, and c joining together the structural parts successively in stacked manner. The production of a perpendicular projection onto a horizontal ground surface is relatively simple, for instance using a ground plan of a building in which a staircase must be placed. In the case of non-standard staircases this will generally result in an elongate template with at least one curve. This template can be manufactured from for instance a plate material such as plywood. Depending on the height of the staircase and the thickness of the plate material used, a large

number of structural parts are then manufactured from plate material which each form a segment of the template. These structural parts will generally also have an elongate form, but are not as long as the template. The structural parts are then fixed to each other in stacked manner such that a perpendicular projection of the assembly of structural parts then provides the form of the template. The structural parts are mutually connected during the stacking. In order to realize a smooth upper and lower edge on the assembly of structural parts joined together in stacked manner, the edges are preferably finished during an additional method step. By manufacturing a stair string in the manner according to the invention, less skilled staircase builders can also construct very complex forms of staircase. In particular the labour-intensive steps of manufacturing the structural parts and joining together these structural parts require little specific knowledge of the building of staircases. The manufacture of a stair string with the described method thus becomes considerably less expensive than heretofore. Another great advantage is the considerable freedom in the design of a stair string; all desired forms can be manufactured. A further advantage is that the desired form can also be arranged accurately in the stair string; the form is controllable. Finally, the method enables manufacture of the stair string from plate material (for instance multi-ply or MDF), which provides a considerable saving compared with the use of good-quality solid wood from which the stair string is generally released in parts.

[0005] During step b so many structural parts are manufactured that the associated overlapping segments of the template enclose the whole template. The stacking of structural parts is only possible when successive structural parts overlap each other over a considerable length. Only when this condition is satisfied can the structural parts be connected firmly to each other. In addition, because of the required height of the stair string it is generally necessary to stack the structural parts in multiple layers. For the manufacture of the structural parts plate material is thus used with a random thickness which can be stacked to a thickness of dozens of layers. It is noted here that for a correct stacking of the structural parts at determined positions relative to the template, markings can be arranged on at least one side of the structural parts left free such that the markings of successive structural parts coincide with each other. The stacking of the structural parts can thus be carried out accurately in simple manner.

[0006] In a preferred application of the method the template is placed horizontally prior to step c and vertical guide members are then placed for vertical stacking of the structural parts. Even more preferably the template is herein manufactured twice and the vertical guide members connect onto the template on a bottom side and a top side. The vertical guide members can consist for instance of slats, beams, tubes, cables etc. The advantage of the vertical guide members is that the tem-

plate acquires a more or less three-dimensional form, whereby purely vertical stacking of the structural parts is simplified. When the vertical guide members have sufficient rigidity, they can also be used to support the (partially) constructed assembly of structural parts. This is possible for instance by means of clamps with which the assembly is coupled to the vertical guide members.

[0007] For a sufficiently sturdy mutual connection, the structural parts can be glued to each other. This is a simple technique for connecting the structural parts, but other techniques can also be envisaged, such as for instance nailing, screwing, pin connections and close-fitting coupling. Combinations of connecting techniques are also conceivable.

[0008] For an aesthetically attractive finish, the stair string can be covered on one or more sides. Examples of covering materials are wood veneer, plastic veneer, varnish etc. It is noted that in practice the upper edge of the stair string can advantageously be covered with multiple layers of vertically placed wood veneer. The suggestion of a stair string made of solid wood can thus be created.

[0009] The invention further provides a method for manufacturing a staircase by assembling treads with at least one string manufactured with the method as described above. These treads can advantageously be manufactured connecting onto the template. Such a staircase can be manufactured in relatively advantageous manner and has a very high degree of design freedom; any form of staircase is in principle relatively simple to realize.

[0010] The invention moreover provides a string of a staircase manufactured from a number of structural parts assembled in stacked manner, which structural parts consist of at least substantially form-retaining parts of plate material. At least one side of the assembly of structural parts is herein preferably covered with a covering layer. A staircase provided with at least one such stair string is also provided by the invention. The advantages of the stair string and staircase according to the invention are already described above with reference to the present method.

[0011] The invention will be further elucidated with reference to the non-limitative embodiments shown in the following figures. Herein:

fig. 1 shows a perspective view of a block of wood for manufacturing a curve or wreath piece in accordance with the prior art,

fig. 2 shows a perspective view of a template manufactured according to step a of the method according to the invention,

fig. 3 shows a perspective view of the stacked assembly of structural parts according to step c of the method according to the invention, and

fig. 4 is a perspective view of a staircase according to the invention.

[0012] Figure 1 shows a block of wood 1 with an obliquely cut side 2 on which are arranged construction lines 3 which originate from a projection for manufacturing a curve or wreath piece. Such a curve or wreath piece can be applied at a position where two straight stair strings meet, for instance at the position of a landing. According to the prior art the curve or wreath piece must be released from the wooden block 1 with conventional wood-working techniques. The manufacture in this way of more complex spatial forms of (parts of) stair strings is very complicated and labour-intensive. In addition, it is practically impossible to obtain the desired spatial shape in very accurate form.

[0013] Figure 2 shows a template 4 which forms a perpendicular projection onto a horizontal plane of a stair string in the situation of use. Template 4 generally has an elongate and curved form. Template 4 can be manufactured from a random, form-retaining material. As also shown in the figure, template 4 can be built up from separate template parts 5,6 rigidly connected to each other.

[0014] Figure 3 shows template 4 placed on the ground 7. Placed perpendicularly above template 4 is a second template 8 with a geometry identical to that of template 4. The two templates 4,8 are joined together by beams 9 which function as guide members and support elements. Structural parts 10 are stacked successively above template 4 in at least partially overlapping manner. These structural parts 10 are manufactured from plate material such that the form thereof corresponds with a part of template 4. The successive structural parts 10 are glued to each other. Thus is created an assembly 11 of structural parts 10 which has a rough shape corresponding with the desired form of the stair string. In order to hold the assembly 11 of structural parts 10 in position, it is fixed to beams 9 in the figure using clamps 12.

[0015] After the assembly 11 of structural parts 10 has the desired height and has set, the upper and lower edge can be brought into a smooth shape by sawing, planing and so on. The thus processed assembly can be further finished, subject to the wishes of the client, with a single or multi-sided covering.

[0016] Finally, figure 4 shows a staircase 13 according to the invention with two stair strings 14,15, both having a complex spatial form which can however be produced in very controlled manner. In the manufacture of stair treads 16 use can likewise be made in advantageous manner of the templates 4,8 for manufacturing the stair strings 14,15, since these treads have to connect to the template in fitting manner.

[0017] Although the invention is described with reference to only a few embodiments, it will be apparent to all that the invention is by no means limited to the described and shown embodiments. On the contrary, many variations are still possible for a skilled person within the scope of the invention.

Claims

- one side of the assembly of structural parts is covered with a covering layer.
1. Method for manufacturing a string of a staircase comprising the method steps of: a) manufacturing a template for the stair string, which template forms a vertical projection onto a horizontal plane of the stair string in the situation of use; 5
 - b) manufacturing structural parts from a substantially form-retaining plate material, wherein the structural parts correspond with segments of the template in a manner such that successive structural parts form at least partly overlapping segments of the template, and 10
 - c) joining together the structural parts successively in stacked manner. 15
 2. Method as claimed in claim 1, comprising an additional method step d) of finishing the edges of the assembly of structural parts joined together in stacked manner. 20
 3. Method as claimed in claim 1 or 2, wherein during step b) so many structural parts are manufactured that the associated overlapping segments of the template enclose the whole template. 25
 4. Method as claimed in any of the foregoing claims, wherein the template is placed horizontally prior to step c) and vertical guide members are then placed for vertical stacking of the structural parts. 30
 5. Method as claimed in claim 4, wherein the template is manufactured twice and the vertical guide members connect onto the template on a bottom side and a top side. 35
 6. Method as claimed in any of the foregoing claims, wherein the structural parts are glued during step c). 40
 7. Method as claimed in any of the foregoing claims, wherein the stair string is covered on one or more sides after step d).
 8. Method for manufacturing a staircase by assembling treads with at least one string manufactured with the method as claimed in any of the foregoing claims. 45
 9. Method as claimed in claim 8, wherein the treads are manufactured connecting onto the template. 50
 10. String of a staircase manufactured from a number of structural parts assembled in stacked manner, which structural parts consist of at least substantially form-retaining parts of plate material. 55
 11. Stair string as claimed in claim 10, wherein at least
 12. Staircase provided with at least one stair string as claimed in either of the claims 10 or 11.

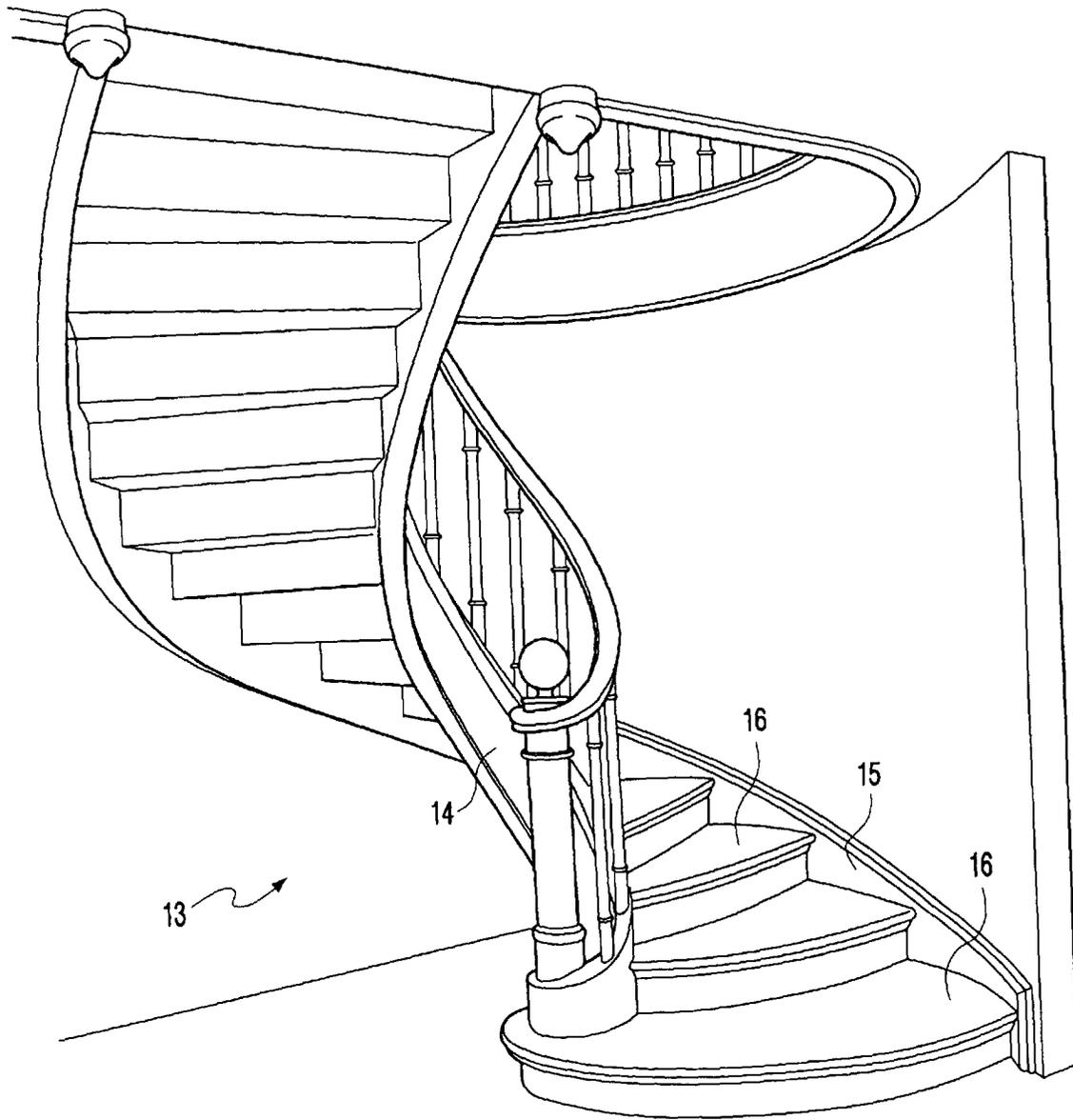


FIG. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 00 20 3721

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | |
|---|---|---|--|
| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int.Cl.7) |
| A | US 4 918 799 A (BENEDETTI LOUIS) 24 April 1990 (1990-04-24) * the whole document * ----- | 1 | B27M3/12 B27M3/00 E04F11/02 |
| X | FR 2 544 773 A (HERTRICH SARL MEUBLES MICHEL) 26 October 1984 (1984-10-26) * page 2, line 7 - line 10; figure 1 * ----- | 10-12 | |
| | | | TECHNICAL FIELDS SEARCHED (Int.Cl.7) |
| | | | B27M E04F |
| The present search report has been drawn up for all claims | | | |
| Place of search THE HAGUE | | Date of completion of the search 23 January 2001 | Examiner Huggins, J |
| CATEGORY OF CITED DOCUMENTS | | T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document | |
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 20 3721

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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23-01-2001

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|--|------------------|-------------------------|------------------|
| US 4918799 A | 24-04-1990 | NONE | |
| FR 2544773 A | 26-10-1984 | NONE | |

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82