STRUCTURE AND METHOD FOR INSTALLING STAIRCASE TREADS

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Appl. No.: 12/799,019
Filed: Apr. 19, 2010

Publication Classification

Int. Cl.  E04F 11/108  (2006.01)
          E04F 21/26  (2006.01)
          E04F 11/02  (2006.01)

ABSTRACT

A stair tread structure includes a tread body comprised of a core having a plurality of layered glued plywood members, top and bottom veneer layers glued to the core for minimizing warping of the tread, and an elongate hardwood leading edge formed with an inside ridge to fit into the core and veneer layers in a tongue and groove manner. Included is a jig/template for onsite trimming of the stair tread ends as needed for fitting of an end-cap, thus providing proper onsite fitting of each stair tread.
STRUCTURE AND METHOD FOR INSTALLING STAIRCASE TREADS

BACKGROUND

[0001] The background of the invention will be discussed in two parts.

FIELD OF THE INVENTION

[0002] The present invention relates to staircase treads, and more particularly to structure and method for onsite remodeling of existing staircase tread and stair carriage.

PRIOR ART

[0003] Most stairways in modern American homes were built by framing carpenters with the stairs covered by carpet. To improve the appearance of their staircases homeowners often replace the carpet with full length stair treads. However, because of the original rough carpentry work proper fitting of stair treads during remodeling is usually very difficult. A search of the prior art has not disclosed the structure and method for installing staircase treads disclosed in the present invention. However, structure and methods of interest are disclosed in U.S. Pat. No. 5,985,398 issued to Bellegarde on 16 Nov. 1999, and No. 6,596,362 issued to Chung on 22 Jul. 2003. Also of interest is US 2006/0196129 A1 (Alfonso Lin) published on 7 Sep. 2006.

[0004] U.S. Pat. No. 5,985,398 to Bellegarde discloses a conventional staircase tread structure having a transverse elongated nose member and a plurality of elongate tread pieces glued laterally to each other, the nose member having a curved front protruding flange glued to a core layer. The tread body is made up of multiple tread pieces that are glued laterally to each other before the nose member is applied and bonded. This procedure however is unsatisfactorily tedious and time consuming. Further, simply gluing the tread body pieces together with the nose member does not provide sufficient bonding to prevent inadequate disassociation of the tread pieces over time.

[0005] U.S. Pat. No. 6,596,362 to Chung discloses a staircase tread structure having an elongate nose member, a plurality of tread bodies, and an end member. The nose member has a semi-circular front flange with each of the tread bodies made up of a core layer with laminated upper and lower surface layers. The core layer includes middle pieces of various sizes that are glued together at the middle section thereof with two lateral end pieces of different sizes bonded with the middle pieces.

[0006] Published application US 2006/0196129 A1 (Alfonso Lin) discloses a staircase tread structure having a tread body made up of a core layer, a plurality of lateral connecting members, a tread end member, a plurality of external connecting sheets, and a nose member. The core layer and the tread end member are made up of board bodies of lower quality materials such as recycled wood, plywood, or sawdust which is processed and bonded into one piece with the connecting members, external connecting sheets, and tread nose member glued thereto.

[0007] Although adequate for their intended use, these prior art structures do not disclose the advantages inherent in the present invention. It is thus an aspect of the present invention to provide improved staircase tread structure and method of installation which may be used at initial fabrication of the staircase treads, or for onsite remodeling of existing staircases. Other aspects and advantages will become readily apparent from a reading of the specification when taken in conjunction with the drawings in which like reference numerals refer to like elements in the several views.

SUMMARY

[0008] The structure of the present invention includes a tread body comprised of a core having a plurality of layered glued plywood members, veneered top and bottom layers glued to the core for minimizing warping of the tread, and an elongate hardwood leading edge formed with an inside ridge to fit into the core and veneer layers in a tongue and groove manner. Included is a jig/template for onsite trimming of the stair tread ends as needed for fitting of an end-cap, thus providing proper onsite fitting of each tread.

DRAWINGS

[0009] FIG. 1 is a perspective view of a partially assembled staircase tread in accordance with the present invention; FIG. 2 is an exploded view of the staircase tread as depicted in FIG. 1; FIG. 3 shows in a perspective view the core body and leading edge trimmed to fit the trimmed end-cap; FIG. 4 shows in a perspective view of the staircase tread depicted in FIG. 1 illustrating the addition of a side end-cap to match the core and leading edge as shown in FIG. 2; FIG. 5A is a cross-sectional view taken along lines 5a-5a of the staircase tread of FIG. 3 illustrating tongue and groove attachment of the leading edge to the core body; FIG. 5B is a cross-sectional view of a second embodiment of the invention; FIG. 5C is a cross-sectional view of a third embodiment of the invention showing fitting of the leading edge to the core body without tongue and groove attachment; FIG. 6 is a perspective view illustrating placement of the staircase treads of the invention onto a staircase with addition of the side end-cap to the stair treads; FIG. 7 is a cross-sectional view taken along the lines 7-7 of FIG. 6; FIG. 8 is a perspective view showing the stair tread placed in the jig/template for end trimming for fitting of the end-cap as indicated in FIG. 4; FIG. 9 is a cross-sectional view showing placement of the stair tread in the jig/template for end trimming of the stair tread for fitting of an end-cap.

DESCRIPTION

[0020] The present invention is primarily useful for onsite remodeling of an existing staircase, however it can be used equally well at initial fabrication of stairways. Existing staircases were mostly installed by framing carpenters with the stairs to be covered by carpet, the rough framing having imprecise tolerances, usually being 1/4 to 1/2 inch. This rough carpentry work makes it difficult to install and properly fit specialized stair treads after removal of the carpet. For instance, most walls are not sufficiently straight which requires each tread end to be cut and carefully fitted to prevent unacceptable gaps between the stair tread and the wall. The finish carpenter must butt each stair tread to the wall, scribe a line, and then cut or shape the stair tread wall end to fit tightly against the wall. These and other problems have shown prior art methods of replacing stairway carpet with specialized stair
treads to be inadequate. There is thus an existing need for improved structure and method for onsite remodeling of existing stair tread and stair carriage.

[0021] Referring to the drawings in general, and initially to FIG. 1, there is shown a perspective view of a basic staircase tread, generally designated 10, in accordance with the invention. The staircase tread 10 is made up of a multiple layer core, generally designated 11, a top layer 12, a bottom layer 13, and a leading edge, or nose, member 14. The leading edge, or nose member, 14 has a curved front face and a rearward projecting portion, generally designated 14a, which mates to both the core 11 and the top and bottom layers 12, 13 in a tongue and groove manner. The tread 10 is shown without an end-cap which will be further described below.

[0022] FIG. 2 illustrates in exploded view the staircase tread 10 as shown in FIG. 1. The core 11 is fabricated of layered and glued plywood members and the nose member 14 is of hardwood. Plywood is generally used for the layered core 11 since it is much less susceptible to warping than solid wood cores. It is to be understood that the number of layers of plywood in core 11 can be varied in accordance with the invention. The top and bottom layers 12 and 13 respectively, have a surface veneer of a higher quality wood and are glued respectively to the top and bottom of core 11. The combination of the top and bottom layers 12, 13 minimizes warping or cupping of the tread 10, that is, as the glue dries on the layers 12, 13 the shrinking on one layer counteracts the shrinking of the other layer. The layers 12, 13 are sufficiently thick, such as 1/4 inch, to permit sanding of the top layer 12 when it is desired to refinish the layer surface.

[0023] The nose member 14 is of solid hardwood and fitted and glued to the assembled plywood core 11 and veneer layers 12, 13 by a tongue and groove joint, generally designated 14a in FIG. 1, which increases the shear strength of the tread 10 and nose member 14. The joint 14a is formed with the nose member 14 having a rearward projection for fitting into a groove formed in the core 11. As indicated the layers 12, 13 are fabricated with grains in the same direction, that is, transverse of the tread. In the core 11 the various layers are fabricated with the grains thereof alternated. The nose member 14 is attached to the core 11 during manufacturing and prior to installation of the tread 10.

[0024] FIG. 3 illustrates assembled core 11, veneered layers 12, 13 and nose member 14 trimmed, or beveled, to form a bonded miter joint fitting with the trimmed side end-cap 15. The trimming can be done onsite is done by means of a jig/template as will be described.

[0025] FIG. 4 is a perspective view showing an assembled staircase tread 10 wherein the side end-cap 15 has been added. As indicated the grain of the nose member 14 is in the same direction as that of the veneered top 12 whereas the grain of the end-cap 15 is perpendicular to the grain of the veneered top 12 and the nose member 14.

[0026] FIG. 5A is in a cross-sectional view of the tread 10 of FIG. 3, illustrates the tongue and groove fitting of nose member 14 to the combined assembly of core 11 and the veneered layers 12, 13. As seen, nose member 14 has a rounded generally semi-circular nose that merges evenly with layers 12 and 13, and as mentioned, a tongue portion that is inserted into a groove portion of core 11.

[0027] FIG. 5B shows in cross-sectional view another embodiment of the invention. This embodiment includes additional alternated veneer layers 12a, 13a and a different core, generally designated 11a, that has a different number of core layers.

[0028] FIG. 5C is a cross-sectional view illustrating yet another embodiment of the invention wherein the nose member 14 has a planar surface interfacing with the assembled core 11 and layer. In this embodiment no bottom layer is included below the core.

[0029] FIG. 6 illustrates in perspective view a completed installation of the staircase treads 10, including nose members 14 and end-caps 15 onto an existing staircase. Shown are multiple treads 10 showing the overhang of nose members 14 over the stair treads 10.

[0030] The many variances in length as well as other adjustments that are required to properly install the staircases treads 10, using "pre-made" exact length staircase treads with the nose members already attached, are very difficult to work with. On the open side of the staircase, where the handrail balusters/spindles are to be installed, each stair tread 10 is scribed where the wall comes up under the stair tread. After scribing this open side, the installer must add roughly 1/8" to the measurement to allow for end cap 15 to overhang the leading edge 14. Otherwise the tread ends 15 would be flush with the wall. This scribed line must be made to be at a 90 degree angle (square) again because of the rough cuts by the original framers. The treads 10 of the present invention are fabricated longer than necessary so they can be cut, scribed and trimmed to exact length as needed to attach the hardwood end-cap 15 onsite. Onsite fitting of end-caps 15 is accomplished by use of the stair end trimming jig/template 80 as will be described.

[0031] FIG. 7 is a cross-sectional view taken along the lines 7-7 of FIG. 6 and illustrates fitting of the treads 10 of the invention onto an existing staircase. Shown are multiple stair treads 10 showing the overhang of nose members 14 over the treads 10. The overhang is usually 1/4" beyond the stair riser 70. The nose members 14 are generally 5/8" wide (thick) so that the tongue and groove glue joint at 14a is not directly over the stair riser which reduces the shear effect at the joint 14a. The riser 70 will generally be 1/4" back of the front of the leading edge 14, thus the riser 70 will not act as a fulcrum directly on the glued joint 14a.

[0032] FIG. 8 is a perspective view illustrating the jig/template 80 for use with a router 81 to trim or bevel the end of the stair tread 10 for forming a miter joint with the stair tread end-cap 15. The stair jig/template 80 is fabricated to be used on either the left or right side of the tread 10, whichever is the open side with the tread ends exposed. The front of the jig/template 80, that lines up against the solid hardwood leading edge 14 of the stair tread 10 is fixed, whereas the back of the jig/template 80 that lines up against the back of the stair tread 10 is adjustable to allow for various widths of the stair tread to be trimmed. Both the front and back of the jig/template 80 have replaceable wood backing blocks 82, 82a, respectively, to prevent tearing out of the stair tread edge when it is being routed for the fitting of the returned end-caps 15.

[0033] When jig/template 80 is adjusted for the width of the tread 10 and then clamped down onto the stair tread 10 the cutting edge will be automatically set square at 90 degrees. Thus, jig/template 80 is formed with substantially identical ends having reversed cutouts for trimming either end of the tread 10 to accept an appropriately trimmed end cap 15.
Fitting of the trimmed end-cap 15 to the stair tread 10, after the stair tread 10 has been trimmed, has been indicated in FIG. 4.

FIG. 9 shows in cross-sectional view, placement of a stair tread 10 in the jig/template 80 for trimming of the tread. More clearly shown are the blocks 82, 82a, the clamps, generally designated 83, and the placement of the tread 10 in the jig/template 80. The jig/template 80 is machined to precisely match the shape of the supplied, solid hardwood end-cap 15. In operation the installer clamps the jig/template 80 onto the tread body 10 where he drew the leading edge overhang line that is 1/4" past the wall scribe line (see above) and then runs the cut off bit of router 81 along the jig/template 80 to get an exact cut. The end-cap 15 is then attached to tread 10 using glue and finishing nails.

In accordance with the present invention there has been set forth and described a preferred embodiment, however, it is to be understood that other modifications may be made within the spirit and scope of the invention.

What is claimed is:

1. A staircase structure for installation of staircase treads, comprising:
   a core layer made up of multiple board bodies integrally bonded into one piece, said core layer bonded intermediate of a top and bottom layer to form a core body;
   a leading edge member bonded to the front edge of said core body;
   an end cap bonded to a selected side of said core body;
   said top and bottom layers assembled and bonded with the grains thereof in the same directions; and
   said multiple layers of said core are assembled and bonded with the grains thereof in alternate directions.

2. The structure of claim 1 wherein said leading edge includes a lateral coupling projection and said core layer includes a lateral coupling projection for receiving said leading edge coupling projection to provide tongue and groove coupling, and said top and bottom layers are precisely mated with said leading edge to provide a continuous smooth surface.

3. The structure of claim 2 wherein said end cap, said core body and said leading edge are trimmed and assembled to form a miter joint.

4. The structure of claim 3 wherein said top and bottom layers have surfaces of veneered hardwood.

5. The structure of claim 4 wherein said core layers are fabricated of layered and bonded plywood.

6. The structure of claim 5 wherein said leading edge and said end cap are fabricated of hardwood.

7. A staircase structure comprising:
   a stair body having a core layer, a top and bottom layer, and a laterally extending elongate leading edge member;
   said core layer having multiple plywood members integrally bonded into one piece, said core layer bonded intermediate of said top and bottom layers;
   said leading edge member bonded to the combination of said core layer and said top and said bottom layers with said top and bottom layers fitting over said core layer to precisely mate with said leading edge to provide a continuous smooth surface; and
   an end cap bonded to said stair body, said stair body and said end cap matingly trimmed and fitted together to form a miter joint.

8. The staircase structure of claim 7 wherein said core layer is fabricated of layered and glued plywood, said top and bottom layers have surfaces of veneered hardwood, and said leading edge and said end cap are fabricated of hardwood.

9. The staircase structure of claim 7 wherein said top and bottom layers are assembled and bonded with the grains thereof in the same directions and said multiple layers of said core are assembled and bonded with the grains thereof in alternate directions.

10. The staircase structure of claim 9 wherein said leading edge member includes a lateral coupling projection and said core layer includes a matching lateral coupling groove whereby said leading edge member and said core layer are coupled to provide a tongue and groove coupling.

11. A method of providing a staircase tread comprising a laterally extending core body having a multiple board core layer, top and bottom layers bonded to said core layer, a leading edge member bonded to the front edge of said core body and an end cap bonded to a select side of said core body wherein in assembly;

12. The method of claim 11 wherein said core layer is fabricated of layered and bonded plywood.

13. The method of claim 11 wherein said top and bottom layers have surfaces of veneered hardwood.

14. The method of claim 11 wherein said leading edge and said end cap are fabricated of hardwood.

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