



(19) **United States**  
(12) **Patent Application Publication**  
**Chung et al.**

(10) **Pub. No.: US 2008/0216422 A1**  
(43) **Pub. Date: Sep. 11, 2008**

(54) **STAIR SYSTEM**

(52) **U.S. Cl. .... 52/188**

(76) **Inventors: Koo Dong Chung**, Lorton, VA  
(US); **Yong Hwan Won**, Waldorf,  
MD (US)

(57) **ABSTRACT**

Correspondence Address:  
**BIRCH STEWART KOLASCH & BIRCH**  
**PO BOX 747**  
**FALLS CHURCH, VA 22040-0747 (US)**

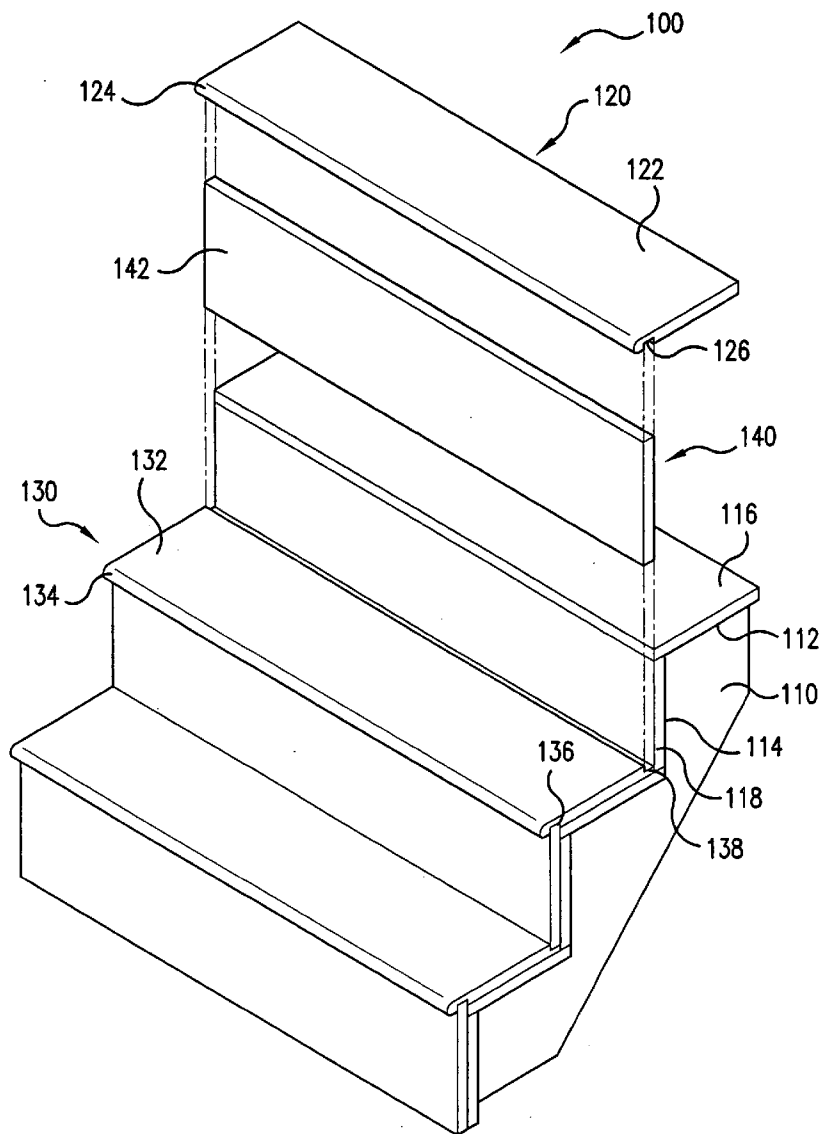
A stair system including an upper tread having a substantially planar body portion, a stair nose portion located at one side of the planar body portion, and a dado located behind the stair nose portion, at least one lower tread, the lower tread having a substantially planar body portion, a stair nose portion located at one side of the planar body portion, a dado located behind the stair nose portion, and a groove located at a side opposite the stair nose portion, and at least two risers, each riser having a substantially planar body portion. In the stair system, one of the at least two risers is receivable between the dado of the upper tread and the groove of the lower tread and the other of the at least two risers is receivable in the dado of the lower tread. Methods for assembling a stair system are also provided.

(21) **Appl. No.: 11/714,774**

(22) **Filed: Mar. 7, 2007**

**Publication Classification**

(51) **Int. Cl.**  
**E04F 11/00** (2006.01)



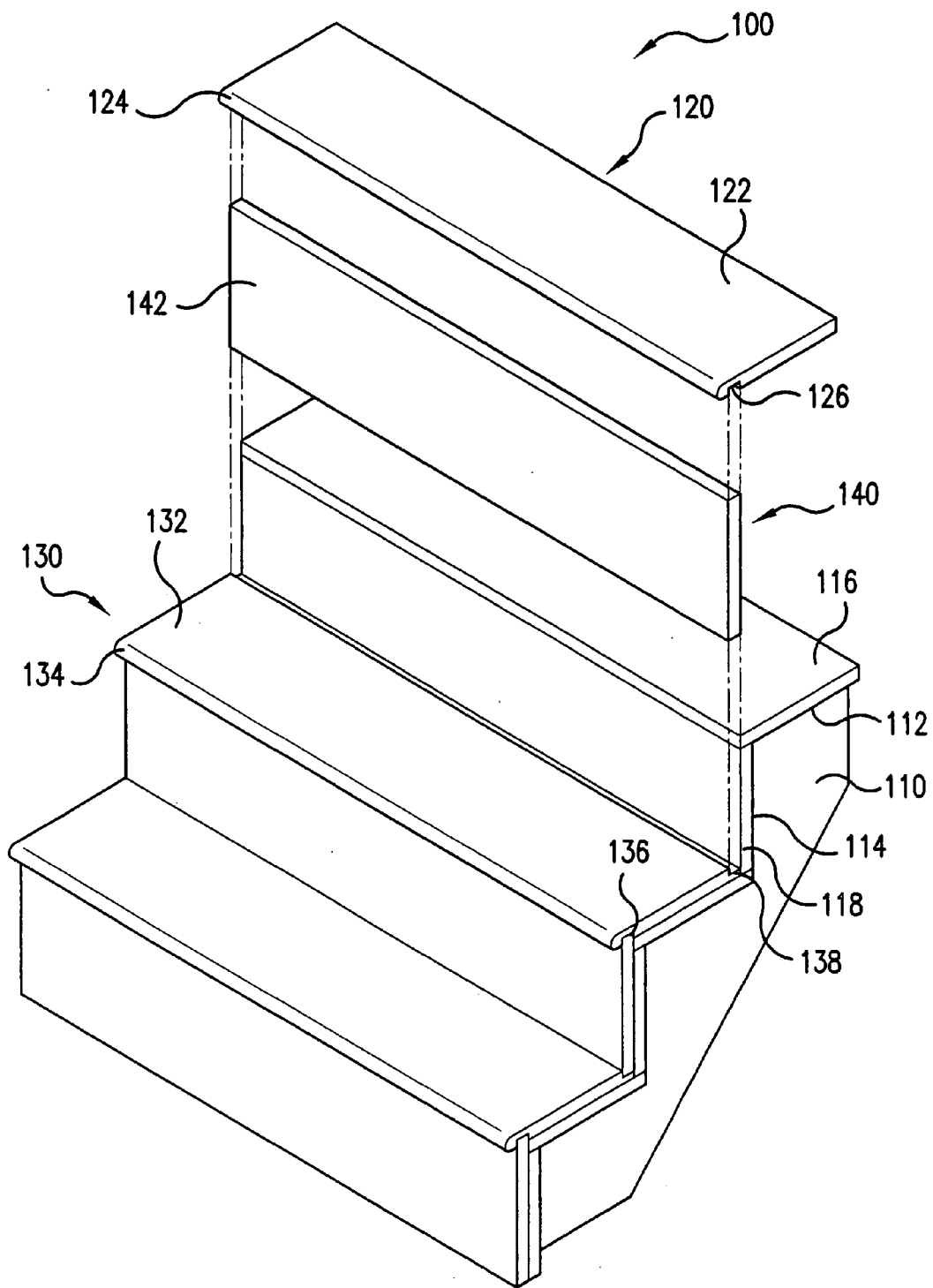


FIG. 1

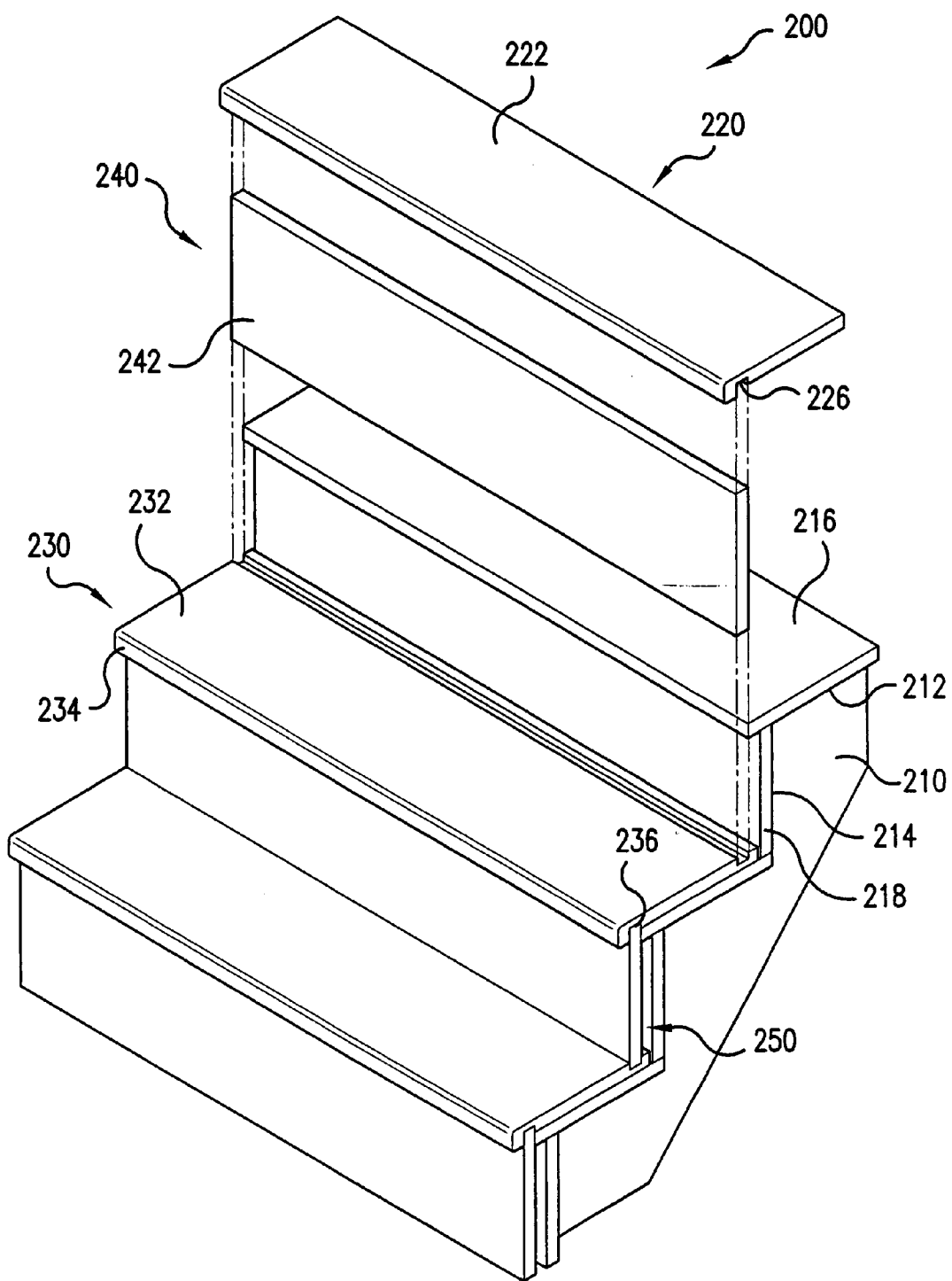


FIG. 2

## STAIR SYSTEM

### BACKGROUND OF THE INVENTION

**[0001]** 1. Field of the Invention

**[0002]** The present invention is generally directed to a stair system, and more particularly to modular treads and risers of a stair system.

**[0003]** 2. Description of Related Art

**[0004]** Generally, stair systems having nose moldings have been constructed in a similar manner using the same basic methods. For example, most stair systems employ a plurality of stringers having tread sides cut out, on which are secured tread sub flooring that span between the stringers. The stringers also have riser sides cut out, on which are secured riser sub floorings that also span between the stringers. Depending on the finishing materials for the stair system, a tread and riser may be mounted to the tread sub flooring or carpeting with or without padding may be affixed to the tread sub flooring and riser sub flooring. Where carpeting is used, the tread sub flooring may provide an overhang to allow the carpet to be affixed to the underside of the overhang, thereby hiding the means of fastening the carpet to the tread sub flooring. Sub flooring is normally secured using nails, screws, and/or adhesives

**[0005]** Because most stair systems are normally built from the top down, in the case of steps having a wood finish, the top most tread is attached using adhesive and a stair nose is attached to the end of the tread to overlap a portion of the tread and to cover the remainder of the tread sub flooring. Generally the stair nose extends beyond the tread sub flooring a sufficient distance to allow a riser to be disposed beneath the stair nose.

**[0006]** The first step below the top step is assembled by placing a riser underneath the stair nose and affixing it to the riser sub flooring using either fasteners or adhesive. The next tread must be cut to have a square edge, as it must abut the riser. Then the stair nose is attached to the end of the tread to overlap a portion of the tread and to cover the remainder of the tread sub flooring as discussed above. This process is repeated for each successive step.

**[0007]** In an alternative stair system, the stair nose may be affixed to the tread by using a tongue and groove relationship. The tread and risers are affixed to the tread sub flooring and riser sub flooring using fasteners or adhesive as described above.

**[0008]** In all of the above cases, it is important that expansion of the wood be accounted for in the assembly of the stairs. As such, sufficient gaps must be provided between pieces of wood to allow the individual pieces to expand.

**[0009]** The first system permits the tread and risers to be free-floating, allow them to contract and expand with changes in temperature and humidity. However, they are unattractive in that the stair nose is higher than the tread because of the overlapping arrangement.

**[0010]** The second system does allow the tread and stair nose to be coplanar, but because they are joined by the tongue and groove, the system does not allow the tread and risers to be free-floating.

**[0011]** U.S. Pat. No. 6,115,975 proposes a solution to providing a nose stair that is coplanar with the tread, but still allows the tread and riser to be free floating. The stair system provides a stair nose connected by a tongue and groove arrangement to a tread. A back molding is affixed to the tread and includes a groove to receive a riser therein. A correspond-

ing groove is formed in the stair nose such that the riser is held between the stair nose and the back molding. In this manner, the riser can be allowed to expand and contract with the temperature and humidity, thereby providing treads and risers that are free floating.

**[0012]** While the solution proposed in U.S. Pat. No. 6,115,975 address the problems identified above, it is a complicated system that requires many additional components. As a result the assembly process is unnecessarily complicated.

### BRIEF SUMMARY OF THE INVENTION

**[0013]** According to principles of this invention, a stair system is provided that minimizes the components of the stair system and provides an efficient assembly process. The stair system includes an upper tread having a substantially planar body portion, a stair nose portion located at one side of the planar body portion, and a dado located behind the stair nose portion, at least one lower tread, the lower tread having a substantially planar body portion, a stair nose portion located at one side of the planar body portion, a dado located behind the stair nose portion, and a groove located at a side opposite the stair nose portion, and at least two risers, each riser having a substantially planar body portion. In the stair system, one of the at least two risers is receivable between the dado of the upper tread and the groove of the lower tread and the other of the at least two risers is receivable in the dado of the lower tread.

**[0014]** In another aspect, the groove of the at least one lower tread may be formed in an upper surface of the planar body portion. The groove of the at least one lower tread may be a rabbet or a dado.

**[0015]** In a different aspect, the at least one lower tread includes a plurality of lower treads. Each of the lower tread may have a substantially planar body portion, a stair nose portion located at one side of the planar body portion, a dado located behind the stair nose portion, and a groove located at a side opposite the stair nose portion. In addition, the at least two risers may include a plurality of risers such that the number of risers corresponds to the number of lower treads plus the upper riser.

**[0016]** In yet another aspect, the stair nose portions of the upper tread may have a thickness substantially equal to the thickness of the planar body portion of the upper tread and the stair nose portion of the at least one lower tread may have a thickness substantially equal to the thickness of the planar body portion of the at least one lower tread. Alternatively, the stair nose portions of the upper tread may have a thickness greater than the thickness of the planar body portion of the upper tread and the stair nose portion of the at least one lower tread may have a thickness greater than the thickness of the planar body portion of the at least one lower tread.

**[0017]** In a further aspect, the stair system includes at least two stringers, each stringer having a plurality of tread sides and a plurality of riser sides, a plurality of tread sub-floorings corresponding to the plurality of tread sides, each of the plurality of tread sub-floorings spanning between the at least two stringers and affixed to corresponding tread sides, and a plurality of riser sub-floorings corresponding to the plurality of riser sides, each of the plurality of riser sub-floorings spanning between the at least two stringers and affixed to corresponding riser sides.

**[0018]** In still another aspect, the upper tread may be affixed to one of the plurality of tread sub-floorings, the at least one lower tread may be affixed to another of the plurality of tread

sub-floorings, and each of the at least two risers may be affixed to different riser sub-floorings.

**[0019]** In yet another aspect, an end of each of the tread sub-flooring may extend beyond the lower adjacent riser sub-flooring such that the riser sub-flooring is recessed behind the end of the tread sub-flooring.

**[0020]** In a further aspect, the upper tread may be affixed to one of the plurality of tread sub-floorings and the at least one lower tread is affixed to another of the plurality of tread sub-floorings.

**[0021]** In still a further aspect, each of the plurality of risers may be affixed to the corresponding dado. Alternatively, each of the plurality of risers may be affixed to the end of the upper adjacent tread sub-flooring.

**[0022]** In accordance with another aspect of the present invention, a method for assembling a stair system, the stair system having at least two stringers, each stringer having a plurality of tread sides and a plurality of riser sides, a plurality of tread sub-floorings corresponding to the plurality of tread sides, each of the plurality of tread sub-floorings spanning between the at least two stringers and affixed to corresponding tread sides, and a plurality of riser sub-floorings corresponding to the plurality of riser sides, each of the plurality of riser sub-floorings spanning between the at least two stringers and affixed to corresponding riser sides. The method includes affixing a first riser to the lowermost riser sub-flooring of the plurality of riser sub-floorings, affixing a lower tread to one of the plurality of tread sub-floorings adjacent the lowermost riser sub-flooring, the lower tread having a substantially planar body portion, a stair nose portion located at one side of the planar body portion, a dado located behind the stair nose portion, and a groove located at a side opposite the stair nose portion, the first riser being receivable in the dado of the lower tread, affixing a second riser to the uppermost riser sub-flooring of the plurality of riser sub-floorings, the second riser being received in the groove of the lower tread, and affixing an upper tread to one of the plurality of tread sub-floorings adjacent the uppermost riser sub-flooring, the upper tread having a substantially planar body portion, a stair nose portion located at one side of the planar body portion, and a dado located behind the stair nose portion, the second riser being received between the groove of the lower tread and the dado of the upper tread.

**[0023]** In another aspect, the method may include affixing an intermediate riser to one of the riser sub-floorings located between the lowermost riser sub-flooring and the uppermost riser sub-flooring, and affixing an intermediate tread to one of the tread sub-floorings located between the lowermost tread sub-flooring and the uppermost tread sub-flooring, the intermediate tread having a substantially planar body portion, a stair nose portion located at one side of the planar body portion, a dado located behind the stair nose portion, and a groove located at a side opposite the stair nose portion.

**[0024]** In a further aspect, where there is only three risers, the intermediate riser is received in the groove of the lower tread and the dado of the intermediate tread and the second riser is received in the groove of the intermediate tread and the dado of the upper tread.

**[0025]** In still another aspect of present invention, another method for assembling a stair system is provided, where the stair system has at least two stringers, each stringer having a plurality of tread sides and a plurality of riser sides, a plurality

of tread sub-floorings corresponding to the plurality of tread sides, an end of each of the tread sub-flooring extends beyond the lower adjacent riser sub-flooring such that the riser sub-flooring is recessed behind the end of the tread sub-flooring, each of the plurality of tread sub-floorings spanning between the at least two stringers and affixed to corresponding tread sides, and a plurality of riser sub-floorings corresponding to the plurality of riser sides, each of the plurality of riser sub-floorings spanning between the at least two stringers and affixed to corresponding riser sides. The method includes affixing a first riser to the lowermost tread sub-flooring of the plurality of tread sub-floorings, affixing a lower tread to the lowermost tread sub-flooring of the plurality of tread sub-floorings adjacent the lowermost riser sub-flooring, the lower tread having a substantially planar body portion, a stair nose portion located at one side of the planar body portion, a dado located behind the stair nose portion, and a groove located at a side opposite the stair nose portion, the first riser being received in the dado of the lower tread, affixing a second riser to the uppermost tread sub-flooring of the plurality of tread sub-floorings, and affixing an upper tread to the uppermost tread sub-flooring of the plurality of tread sub-floorings adjacent the uppermost riser sub-flooring, the upper tread having a substantially planar body portion, a stair nose portion located at one side of the planar body portion, and a dado located behind the stair nose portion, the second riser being received in the dado of the upper tread.

**[0026]** In another aspect, the method includes affixing an intermediate riser to one of the tread sub-floorings located between the lowermost tread sub-flooring and the uppermost riser sub-flooring, and affixing an intermediate tread to one of the tread sub-floorings located between the lowermost tread sub-flooring and the uppermost tread sub-flooring, the intermediate tread having a substantially planar body portion, a stair nose portion located at one side of the planar body portion, a dado located behind the stair nose portion, and a groove located at a side opposite the stair nose portion.

**[0027]** In a further aspect, where there is only three risers, the intermediate riser is received in the groove of the lower tread and the dado of the intermediate tread and the second riser is received in the groove of the intermediate tread and the dado of the upper tread.

**[0028]** Further scope of applicability of the present application will become more apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from the detailed description.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0029]** The present invention will become more fully understood from the detailed description given hereinbelow and the accompanying drawings which are given by way of illustration only, and thus are not limitative of the present invention and wherein:

**[0030]** FIG. 1 is a partially exploded perspective view of the stair system according to a first exemplary embodiment; and

[0031] FIG. 2 is a partially exploded perspective view of the stair system according to a second exemplary embodiment.

#### DETAILED DESCRIPTION OF THE INVENTION

[0032] Referring to FIG. 1, the stair system 100 according to the first exemplary embodiment includes conventional stringers 110 (one shown), each stringer 110 provides a plurality of tread sides 112 and a plurality of riser sides 114 formed therein. A tread sub flooring 116 spans between corresponding tread sides 112 and a riser sub flooring 118 spans between corresponding riser side 114. The stringers 110, tread sub floorings 116, and riser sub floorings 118 are assembled using conventional techniques including fasteners and/or adhesives.

[0033] The stair system 100 includes at least two different treads depending on the location of the tread. As seen in FIG. 1, the uppermost tread or top tread 120 has a planar body portion 122 and a stair nose portion 124. A dado 126 is provided behind the stair nose portion 124 and extends along the length of the planar body portion 122. As shown in FIG. 1, the stair nose portion 124 may have a thickness equal to the planar body portion 122, although it is understood that the stair nose portion 124 may have a greater thickness than the planar body portion 122.

[0034] The stair system 100 includes one or more lower treads 130. Each lower tread 130 has a planar body portion 132 and a stair nose portion 134. A dado 136 is provided behind the stair nose portion 134 and extends along the length of the planar body portion 132. A rabbet 138 is provided at the edge opposite the stair nose portion 134 and extends along the length of the planar body portion 132. Preferably, the width of the rabbet 138 corresponds to the width of either dado 126, 136 depending on the type of tread, either the upper or lower tread 120, 130, arranged above it. As shown in FIG. 1, the stair nose portion 134 may have a greater thickness than the planar body portion 132, although it is understood that the stair nose portion 134 may have the same thickness as the planar body portion 132. Preferably, the stair nose portion 134 of the lower tread 130 has the same thickness of the stair nose portion 124 of the upper tread 120.

[0035] In addition to the two types of treads discussed above, the stair system 100 includes at least two risers 140. Each riser 140 has a substantially planar body 142 and is configured to cooperate with one or more of the treads to form the stair system 100.

[0036] The treads 120, 130 and risers 140 can be made out of natural plank wood, such as oak plank. However, the treads 120, 130, and risers 140 can be made out of composites or other preformed materials. In addition, the treads 120, 130, and risers 140 can be provided in many conventional plank widths and thickness, such as, three-quarter inch or one inch thick, as well as custom sizes. Preferably, the treads 120, 130 are sized such that the planar body portion is sufficiently sized to cover the tread sub flooring and that the rabbets and dados correspond to the thickness of the risers. In addition, it is desirable that the depth of the dados and rabbets are selected such that the risers are free to expand within the corresponding dado and/or rabbet without applying a large expansion force to the corresponding treads.

[0037] Next, an exemplary method of assembling the stair system 100 will be described. After the stringers 110, tread sub floorings 116, and riser sub floorings 118 are assembled using conventional techniques including fasteners and/or adhesives, the rest of the stair system is attached. Generally,

this process begins at the bottom of the stair system 100 and progresses up the stair system, although it is understood that a top-down approach may also be used.

[0038] First, one of the plurality of risers 140 is affixed to the surface of the riser sub flooring 118 using adhesive. Because this riser 140 is located at the bottom of the stair system 100, it is preferably to only use an adhesive. However, it is understood that fasteners can be used and that if the fasteners are counter-sunk, then the holes may be filled in to hide their location. Alternatively, depending on the flooring that the stair system 100 rests on, that the flooring and/or the stair nose portion 134 may hide fasteners.

[0039] As seen in FIG. 1, the riser 140 extends above the corresponding tread sub flooring 116 such that the lower tread 130 can be fitted over the riser 140 and that the dado 136 receives the riser 140 therein. The lower tread 130 can be affixed to the tread sub flooring 116 using fasteners and/or adhesives. Preferably, the planar body portion 132 is affixed with adhesive while the fasteners (not shown) extend through the rabbet 138 into the tread sub flooring 116. In this manner, the lower tread 130 can reliably be mounted to the tread sub flooring 116, while allowing the fasteners to be hidden from view by the riser 140 inserted at the back of the lower tread 130.

[0040] Specifically, the next riser 140 is attached to riser sub flooring 118 adjacent the rabbet 138. The riser 140 can be attached to the rabbet 138 and/or the riser sub flooring 118 using adhesive. As noted previously, the riser 140 may also be attached using fasteners that are counter sunk and filled in and/or the fasteners may be hidden behind the stair nose portion 134. This process is repeated with the remaining lower treads 130 until the top of the stair system 100 is reached.

[0041] As seen in FIG. 1, the upper most riser 140 extends above the corresponding tread sub flooring 116 such that the upper tread 120 can be fitted over the riser 140 and that the dado 126 receives the riser 140 therein. The upper tread 120 can be affixed to the tread sub flooring 116 using fasteners and/or adhesives. Because no rabbet is provided in the upper tread 120, a continuous planar finish is achieved.

[0042] Depending on the materials selected, the above-described stair system 100 can be provided as a free standing stair system (i.e., no walls provided at either side of the stair system), supported by one wall, or supported by wall on both sides of the stair system. Specifically, depending on the finishing of the wood, the stair system can have an aesthetic appearance without further finishing.

[0043] Because there are times when it is desirable to remove and replace existing tread and/or carpeting, the stair system 100 can be readily adapted to such a process. For example, as seen in FIG. 2, a stair system 200 similar to stair system 100 can be provided. In this arrangement, existing stringers 210 (one shown) may be used. Each stringer 210 includes a plurality of tread sides 212 and a plurality of riser sides 214 formed therein. Existing tread sub flooring 216 spans between corresponding tread sides 212 and existing riser sub flooring 218 spans between corresponding riser side 214. In this exemplary embodiment, the tread sub flooring 216 extends beyond the riser sub flooring a predetermined distance to allow carpeting to wrap around the edge of the tread sub flooring 216 and to be affixed to a lower surface of the tread sub flooring 216. The stringers 210, tread sub floor-

ings 216, and riser sub floorings 218 were previously assembled using conventional techniques including fasteners and/or adhesives.

[0044] As described above for stair system 100, the stair system 200 includes at least two different treads depending on the location of the tread. As seen in FIG. 2, the uppermost tread or top tread 220 has a planar body portion 222 and a stair nose portion 224. A dado 226 is provided behind the stair nose portion 224 and extends along the length of the planar body portion 222. As shown in FIG. 2, the stair nose portion 224 may have a greater thickness than the planar body portion 222, although it is understood that the stair nose portion 224 may have the same thickness as the planar body portion 222.

[0045] The stair system 200 includes one or more lower treads 230. Each lower tread 230 has a planar body portion 232 and a stair nose portion 234. A dado 236 is provided behind the stair nose portion 234 and extends along the length of the planar body portion 232. A second dado 238 is provided near the edge opposite the stair nose portion 234 and extends along the length of the planar body portion 232. Preferably, the width of the second dado 238 corresponds to the width of either dado 226, 236 depending on the type of tread, either the upper or lower tread 220, 230, arranged above it. As shown in FIG. 2, the stair nose portion 234 may have a greater thickness than the planar body portion 232, although it is understood that the stair nose portion 234 may have the same thickness as the planar body portion 232. Preferably, the stair nose portion 234 of the lower tread 230 has the same thickness of the stair nose portion 224 of the upper tread 220.

[0046] In addition to the two types of treads discussed above, the stair system 200 includes at least two risers 240. Each riser 240 has a substantially planar body 242 and is configured to cooperate with one or more of the treads to form the stair system 200.

[0047] The treads 220, 230 and risers 240 can be made out of natural plank wood, such as oak plank. However, the treads 220, 230, and risers 240 can be made out of composites or other preformed materials. In addition, the treads 220, 230, and risers 240 can be provided in many conventional plank widths as well as custom sizes. Preferably, the treads 220, 230 are sized such that the planar body portion is sufficiently sized to cover the tread sub flooring and that the dados correspond to the thickness of the risers. In addition, it is desirable that the depth of each dado is selected such that the risers are free to expand within the corresponding dado without applying a large expansion force to the corresponding treads.

[0048] Finally, as seen in FIG. 2, a gap 250 is formed by the arrangement of the riser 240, tread sub flooring 216 and riser sub-flooring 218. If desired, a pad or other sound dampening material may be placed in the gap to absorb sound during use of the stair system 200.

[0049] Next, an exemplary method of assembling the stair system 200 will be described. After removing any old tread and/or carpeting from the tread sub floorings 216 and riser sub floorings 218, the rest of the stair system is attached. Generally, this process begins at the bottom of the stair system 200 and progresses up the stair system, although it is understood that a top-down approach may also be used.

[0050] First, because the riser sub flooring 218 is recessed from the end of the tread sub flooring 216, one of the plurality of risers 240 is affixed to the end of the tread sub flooring 216 using adhesive and/or fasteners. Because this riser 240 is located at the bottom of the stair system 200, it is preferably to only use an adhesive. However, it is understood that fas-

teners can be used and that fasteners can be hidden by the stair nose portion 234 of the adjacent lower tread 230. Alternatively, depending on the flooring that the stair system 200 rests on, that flooring may also hide the fasteners.

[0051] As seen in FIG. 2, the riser 240 extends above the corresponding tread sub flooring 216 such that the lower tread 230 can be fitted over the riser 240 and that the dado 236 receives the riser 240 therein. The lower tread 230 can be affixed to the tread sub flooring 216 using fasteners and/or adhesives. Preferably, the planar body portion 232 is affixed with adhesive while the fasteners (not shown) extend through the second dado 238 into the tread sub flooring 216. In this manner, the lower tread 230 can reliably be mounted to the tread sub flooring 216, while allowing the fasteners to be hidden from view by the riser 240 inserted at the back of the lower tread 230.

[0052] Specifically, the next riser 240 is attached to the tread sub flooring 216 located above the second dado 238. The riser 240 can be attached to the second dado 238 and/or the tread sub flooring 218 using adhesive. As noted previously, the riser 240 may also be attached using fasteners. This process is repeated with the remaining lower treads 230 until the top of the stair system 200 is reached.

[0053] As seen in FIG. 2, the upper most riser 240 extends above the corresponding tread sub flooring 216 such that the upper tread 220 can be fitted over the riser 240 and that the dado 226 receives the riser 240 therein. The upper tread 220 can be affixed to the tread sub flooring 216 using fasteners and/or adhesives. Because there is no second dado provided in the upper tread 220, a planar finish is achieved.

[0054] As mentioned previously, the spaces 250 between the risers 240 and the riser sub flooring 218 may be filled with pads or other sound absorbing material. Depending on the accessibility of the spaces, the pads may be inserted before securing the corresponding riser 240 to the tread sub flooring 218 or after the riser 240 is secured to the tread sub flooring (e.g., one edge of the stair system 200 is temporarily exposed.)

[0055] Because the second exemplary stair system 200 will most likely be used to replace existing stairs with old tread and/or carpeting, the stair system 200 will probably be supported by walls on both sides of the stair system to hide the space 250 between the riser 240 and the riser sub flooring 218.

[0056] The previously described stair systems allow for quick and easily assembly by minimizing the number of components provided for the stair system. In addition, the treads and risers may be prefabricated such that stair systems can be modular designs. Furthermore, the above stair systems allow old tread and/or carpets to be replaced without removing the entire stair system.

[0057] The invention thus being described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

What is claimed:

1. A stair system comprising:

an upper tread having a substantially planar body portion, a stair nose portion located at one side of the planar body portion, and a dado located behind the stair nose portion; at least one lower tread, the lower tread having a substantially planar body portion, a stair nose portion located at one side of the planar body portion, a dado located

- behind the stair nose portion, and a groove located at a side opposite the stair nose portion; and at least two risers, each riser having a substantially planar body portion, one of the at least two risers being receivable between the dado of the upper tread and the groove of the lower tread, the other of the at least two risers being receivable in the dado of the lower tread.
- 2.** The stair system according to claim **1**, wherein the groove of the at least one lower tread is formed in an upper surface of the planar body portion.
- 3.** The stair system according to claim **2**, wherein the groove of the at least one lower tread is a rabbet.
- 4.** The stair system according to claim **2**, wherein the groove of the at least one lower tread is a dado.
- 5.** The stair system according to claim **1**, wherein the at least one lower tread includes a plurality of lower treads, each of the lower tread having a substantially planar body portion, a stair nose portion located at one side of the planar body portion, a dado located behind the stair nose portion, and a groove located at a side opposite the stair nose portion; and wherein the at least two risers includes a plurality of risers such that the number of risers corresponds to the number of lower treads plus the upper riser.
- 6.** The stair system according to claim **1**, wherein the stair nose portions of the upper tread has a thickness substantially equal to the thickness of the planar body portion of the upper tread and the stair nose portion of the at least one lower tread has a thickness substantially equal to the thickness of the planar body portion of the at least one lower tread.
- 7.** The stair system according to claim **1**, wherein the stair nose portions of the upper tread has a thickness greater than the thickness of the planar body portion of the upper tread and the stair nose portion of the at least one lower tread has a thickness greater than the thickness of the planar body portion of the at least one lower tread.
- 8.** The stair system according to claim **1**, further comprising:
- at least two stringers, each stringer having a plurality of tread sides and a plurality of riser sides;
  - a plurality of tread sub-floorings corresponding to the plurality of tread sides, each of the plurality of tread sub-floorings spanning between the at least two stringers and affixed to corresponding tread sides;
  - a plurality of riser sub-floorings corresponding to the plurality of riser sides, each of the plurality of riser sub-floorings spanning between the at least two stringers and affixed to corresponding riser sides.
- 9.** The stair system according to claim **8**, wherein the upper tread is affixed to one of the plurality of tread sub-floorings, the at least one lower tread is affixed to another of the plurality of tread sub-floorings, and each of the at least two risers are affixed to different riser sub-floorings.
- 10.** The stair system according to claim **8**, wherein an end of each of the tread sub-flooring extends beyond the lower adjacent riser sub-flooring such that the riser sub-flooring is recessed behind the end of the tread sub-flooring.
- 11.** The stair system according to claim **10**, wherein the upper tread is affixed to one of the plurality of tread sub-floorings and the at least one lower tread is affixed to another of the plurality of tread sub-floorings.
- 12.** The stair system according to claim **11**, wherein each of the plurality of risers are affixed to the corresponding dado.

**13.** The stair system according to claim **12**, wherein each of the plurality of risers are affixed to the end of the upper adjacent tread sub-flooring.

**14.** A method for assembling a stair system, the stair system having at least two stringers, each stringer having a plurality of tread sides and a plurality of riser sides, a plurality of tread sub-floorings corresponding to the plurality of tread sides, each of the plurality of tread sub-floorings spanning between the at least two stringers and affixed to corresponding tread sides, and a plurality of riser sub-floorings corresponding to the plurality of riser sides, each of the plurality of riser sub-floorings spanning between the at least two stringers and affixed to corresponding riser sides, the method comprising:

affixing a first riser to the lowermost riser sub-flooring of the plurality of riser sub-floorings;

affixing a lower tread to one of the plurality of tread sub-floorings adjacent the lowermost riser sub-flooring, the lower tread having a substantially planar body portion, a stair nose portion located at one side of the planar body portion, a dado located behind the stair nose portion, and a groove located at a side opposite the stair nose portion, the first riser being received in the dado of the lower tread;

affixing a second riser to the uppermost riser sub-flooring of the plurality of riser sub-floorings, the second riser being received in the groove of the lower tread; and

affixing an upper tread to one of the plurality of tread sub-floorings adjacent the uppermost riser sub-flooring, the upper tread having a substantially planar body portion, a stair nose portion located at one side of the planar body portion, and a dado located behind the stair nose portion, the second riser being received between the groove of the lower tread and the dado of the upper tread.

**15.** The method according to claim **14**, further comprising: affixing an intermediate riser to one of the riser sub-floorings located between the lowermost riser sub-flooring and the uppermost riser sub-flooring; and

affixing an intermediate tread to one of the tread sub-floorings located between the lowermost tread sub-flooring and the uppermost tread sub-flooring, the intermediate tread having a substantially planar body portion, a stair nose portion located at one side of the planar body portion, a dado located behind the stair nose portion, and a groove located at a side opposite the stair nose portion.

**16.** The method according to claim **15**, wherein there is only three risers, the intermediate riser is received in the groove of the lower tread and the dado of the intermediate tread and the second riser is received in the groove of the intermediate tread and the dado of the upper tread.

**17.** A method for assembling a stair system, the stair system having at least two stringers, each stringer having a plurality of tread sides and a plurality of riser sides, a plurality of tread sub-floorings corresponding to the plurality of tread sides, an end of each of the tread sub-flooring extends beyond the lower adjacent riser sub-flooring such that the riser sub-flooring is recessed behind the end of the tread sub-flooring, each of the plurality of tread sub-floorings spanning between the at least two stringers and affixed to corresponding tread sides, and a plurality of riser sub-floorings corresponding to the plurality of riser sides, each of the plurality of riser sub-floorings spanning between the at least two stringers and affixed to corresponding riser sides, the method comprising:



affixing a first riser to the lowermost tread sub-flooring of the plurality of tread sub-floorings;  
affixing a lower tread to the lowermost tread sub-flooring of the plurality of tread sub-floorings adjacent the lowermost riser sub-flooring, the lower tread having a substantially planar body portion, a stair nose portion located at one side of the planar body portion, a dado located behind the stair nose portion, and a groove located at a side opposite the stair nose portion, the first riser being received in the dado of the lower tread;  
affixing a second riser to the uppermost tread sub-flooring of the plurality of tread sub-floorings; and  
affixing an upper tread to the uppermost tread sub-flooring of the plurality of tread sub-floorings adjacent the uppermost riser sub-flooring, the upper tread having a substantially planar body portion, a stair nose portion located at one side of the planar body portion, and a dado located behind the stair nose portion, the second riser being received in the dado of the upper tread.

**18.** The method according to claim **17**, further comprising:  
affixing an intermediate riser to one of the tread sub-floorings located between the lowermost tread sub-flooring and the uppermost riser sub-flooring; and  
affixing an intermediate tread to one of the tread sub-floorings located between the lowermost tread sub-flooring and the uppermost tread sub-flooring, the intermediate tread having a substantially planar body portion, a stair nose portion located at one side of the planar body portion, a dado located behind the stair nose portion, and a groove located at a side opposite the stair nose portion.

**19.** The method according to claim **18**, wherein there is only three risers, the intermediate riser is received in the groove of the lower tread and the dado of the intermediate tread and the second riser is received in the groove of the intermediate tread and the dado of the upper tread.

\* \* \* \* \*