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RAILING POST BLOCKING SYSTEMS AND METHODS

Abstract

A deck frame includes at least one perimeter support member that supports a plurality of support joists. A post blocking assembly is disposed between adjacent support joists and supports a railing post. The post blocking assembly includes an angle bar, a first side plate secured to a first end of the angle bar and a second side plate secured to a second end of the angle bar opposite the first end. A first nut is threaded to a first bolt that extends through the first side plate, and a second nut is threaded to a second bolt that extends through the second side plate. The first side plate defines a first anti-rotation through hole and the second side plate defining a second anti-rotation through hole.

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Background/Summary

PRIORITY CLAIM [0001] This application claims priority to U.S. Provisional Application for Patent Ser. No. 63/553,341, filed on Feb. 14, 2024, the disclosure of which is incorporated herein by reference.

BACKGROUND

[0002] Home and business owners often enhance their outdoor living experience with outdoor decks. Often these decks are constructed with lumber, and the deck surface is natural wood. Alternatively, deck surfaces may be an extruded polymeric composite material that simulates natural lumber. The deck surfaces are often elevated from the ground by a deck frame. The elevation creates a risk that one could fall off the deck and become injured. Railings guard against this risk. Railings should be sufficiently sturdy to withstand someone falling against it and not fail to perform its barrier function. The underlying deck frame may require specific features to support the railing posts that support the railing.

SUMMARY OF THE INVENTION

[0003] A deck frame includes at least one perimeter support member that supports a plurality of support joists. A post blocking assembly is disposed between adjacent support joists and supports a railing post. The post blocking assembly includes an angle bar, a first side plate secured to a first end of the angle bar and a second side plate secured to a second end of the angle bar opposite the first end. A first nut is threaded to a first bolt that extends through the first side plate, and a second nut is threaded to a second bolt that extends through the second side plate. The first side plate defines a first anti-rotation through hole, and the second side plate defines a second anti-rotation through hole.

[0004] According to an embodiment, the first nut may be a weld nut that is welded to the first side plate and the second nut may be a weld nut that is welded to the second side plate. Alternatively, the nut may be omitted and the first side plate may have a tapped hole to engage the threads of the first bolt and the second side plate may have a tapped hole to engage the threads of the second bolt.

[0005] According to an alternate embodiment, a deck surface is supported at least by the plurality of support joists. The deck surface supports a railing post that has a post base.

[0006] According to an alternate embodiment, the angle bar includes an upper wall and a lateral wall, and the railing support post includes a base plate defining a plurality of through holes aligned with the angle bar.

[0007] According to an alternate embodiment, the deck frame assembly further includes a first bolt in threaded engagement with the first weld nut and a second bolt in threaded engagement with the second weld nut. Anti-rotation screws may be received through respective through holes.

[0008] Technical advantages of a post blocking assembly according to the teachings of the present disclosure include a pre-fabricated, ready to install, post blocking assembly that is easy to install with conventional bolts and predrilled holes. Other technical advantages include a railing post blocking assembly with anti-rotation features that function to withstand certain forces possibly exerted on railing posts of a railing for an outdoor, elevated deck.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The disclosure will become more fully understood from the following detailed description, taken in conjunction with the accompanying figures, wherein like reference numerals refer to like elements, in which:

[0010] FIG. **1** is a perspective view of a portion of a deck frame including a railing post blocking assembly with a deck surface shown in phantom line.

[0011] FIG. **2** is a partially exploded, perspective view of the deck frame of FIG. **1** with the railing post blocking assembly exploded away from the other components of the deck frame.

[0012] FIG. **3** is an underside, perspective view of the deck frame of FIG. **1** showing a step of assembling the railing post blocking assembly to the deck frame.

[0013] FIG. **4** is an underside, perspective view of the deck frame of FIG. **1** showing a step of assembling the railing post blocking assembly to the deck frame.

[0014] FIG. **5** is an underside, perspective view of an alternate embodiment of a railing post blocking assembly according to the teachings of the present disclosure.

[0015] FIG. **6** is an underside, perspective view of an alternate embodiment of a railing post blocking assembly according to the teachings of the present disclosure.

[0016] FIG. **7** is an underside, perspective view of a deck frame employing an alternative technique for railing post blocking using a bracket and cut down portion of a tube joist.

[0017] FIG. **8** is a perspective view of the bracket of FIG. **7**.

[0018] FIG. **9** is a perspective view of an alternate bracket to the bracket shown in FIG. **8**.

DETAILED DESCRIPTION

[0019] Embodiments disclosed herein provide systems and methods for blocking posts for outdoor decks. The systems disclosed provide blocking to allow a railing support post to be secured to an outdoor deck. A post base is secured to a deck surface and to a deck frame including a post blocking assembly according to the teachings of the present disclosure. The post blocking assemblies disclosed herein provide efficiencies when installing a railing post to an outdoor deck.

[0020] FIG. **1** is a perspective view of a portion of a deck frame **10** with portions of a deck surface **12** illustrated in broken lines to show details of the deck frame **10**. The deck surface **12** may be natural wood. Alternatively, the deck surface **12** may be an extruded polymeric composite material that simulates natural lumber. The deck frame **10** includes a perimeter support member **14** that supports a plurality of joists **16**. The perimeter support member may be a beam, rim joist, ledger, and the like. The plurality of joists **16** may be hollow box-shaped tube joists **16**. Each joist **16** is supported by a joist support bracket **24** that attaches to the perimeter support member **14** and each of the joists **16**. According to an embodiment, the joist support brackets **24** may be hanger brackets, as shown. Other suitable joist support brackets **24** are contemplated by this disclosure.

[0021] In addition to the deck surface **12**, the deck frame **10** supports at least one railing post **18**. The railing post **18** provides a support structure and a mounting face for a railing panel. A plurality of railing panels may be supported by a plurality of railing support posts **18**, which in turn are supported by the deck frame **10** and mounted to the deck frame **10** through the deck surface **12**. The plurality of railing panels and the plurality of railing support posts **18** provide a safety railing barrier around a perimeter of an elevated outdoor deck.

[0022] The railing post **18** includes a post base **20**. The post base **20** may be a flat plate with through holes formed proximate the corners of the flat plate. The post base **20** allows the railing post **18** to be mounted to the deck frame **10**. The railing post **18**, more specifically the post base **20**, is mounted to the perimeter support member **14** and a post blocking assembly **22**. The post blocking assembly bridges a gap between adjacent joists **16** and provides a sturdy structure to assist in mounting the railing post **18** to the deck frame **10**. Fasteners **26** are received through the holes in the post base **20** and corresponding holes formed in the deck surface **12**. The fasteners **26** are then received in pilot or other through holes formed in the perimeter support member **14** and the post

blocking assembly **22**. Fasteners **26** may be self-tapping sheet metal screws, for example a Type-F thread cutting screw. For example, a #**12** self-tapping sheet metal screw may be used.

[0023] Alternatively, suitable length bolts in lieu of the self-tapping screws. The bolts may be used after drilling holes through the deck surface **12** and the perimeter support member **14** and the post blocking assembly **22** to receive the bolts. Washers and nuts may be secured to the end of the bolt extending through the underside of the perimeter support member **14** and the post blocking assembly **22**. According to an embodiment, $\frac{3}{8}$ inch \times 8 inch galvanized bolts secured with nuts and washers may be used through the perimeter support member **14**, and $\frac{3}{8}$ inch \times 3 inch galvanized bolts with nuts and washers may be used through the post blocking assembly **22**.

[0024] The components identified herein may be made from any suitable material. For example, the deck frame **10** and the post blocking assembly **22** may be formed of light gauge steel. For example the perimeter support member **14**, the joist support brackets **24**, and the joists **16** may be formed of 16-gauge or 18-gauge structural steel. A coating, such as a powder coating, may be applied to the components. According to an embodiment, the post blocking assembly **22** is formed of Q345 steel having a thickness of about 0.25 inches.

[0025] FIG. **2** is a perspective view of the portion of the deck frame **10** with the post blocking assembly **22** exploded away to illustrate installation of the post blocking assembly **22** to a constructed deck frame **10**. In a first step, the post blocking assembly **22** is positioned at a predetermined distance from the perimeter support member **14** corresponding to a width of the post base **20** and markings are made through bolt receiving through hole **28** formed through each side plate **42** of the post blocking assembly **22**. The markings are made on the side walls of each of the adjacent joists **16** to mark drilling locations for holes through each joist **16**. Alternatively, the markings may be made using a template of the hole positions in the post blocking assembly **22**.

[0026] A through hole **30** is drilled through each side wall of each joist **16**. A bolt **32** is received through the side walls and in threaded engagement with a weld nut **34** secured to an interior surface of each side plate **42**. The bolt **32** may be any suitable bolt with sufficient length to traverse the joist and engage the threads of the weld nut **34**. According to an embodiment, the weld nut **34** may be a standard nut that is not welded to the side plate **42**. Alternatively, the nut may be omitted and the side plate **42** may have a tapped hole to engage the threads of the bolt **32**. According to an embodiment, the bolt **32** may have a length that is about one inch greater than the thickness of the support joist **16**. In embodiments with a one-inch thick joist, the bolt **32** may have a length of approximately two inches. According to an alternate embodiment, the bolt **32** may be a $\frac{3}{8}$ "-**16** \times 3 inch bolt. Such bolt **32** can be used for joists that are approximately two inches in thickness.

[0027] FIG. **3** shows a perspective view of another step in installing the post blocking assembly **22**. After the bolts **32** are threaded into the weld nuts **34**, anti-rotation screws **36** are received through anti-rotation screw holes **38** formed in the side plate **42** of the post blocking assembly **22**.

According to an embodiment, a pilot hole may be marked and drilled through the inner side wall of the joist **16** to facilitate receiving a self-tapping anti-rotation screw **36** securing the post blocking assembly **22** to the side wall of the joist **16**. One anti-rotation screw **36** is received through each of two anti-rotation screw holes **38**. The anti-rotation screws **36** prevent unintended rotation of the post blocking assembly **22** when a force is applied perpendicularly to the railing post **18** to generate a torque on the post blocking assembly **22**. The anti-rotation screws **36** may be any suitable sheet metal screw. According to one embodiment, the anti-rotation screw **36** may be a self-tapping sheet metal screw, for example a Type-F thread cutting screw. According to an embodiment, the anti-rotation screw holes **38** are positioned a maximum distance from the bolt receiving through hole **28** to reduce the load applied in shear to the anti-rotation screw **36** when a force is applied perpendicularly to the railing post **18** to generate a torque on the post blocking assembly **22**.

[0028] FIG. **4** is a perspective view of an embodiment of a post blocking assembly **22** installed to a portion of a deck frame **10** showing the anti-rotation screws **36** installed (only one anti-rotation screw **36** shown).

[0029] Returning to FIG. 2, the post blocking assembly 22 includes an angle bar 40 and a pair of side plates 42 welded or otherwise secured to each end of the angle bar 40. The angle bar 40 includes an upper wall 41 and a lateral wall 43. The angle bar 40 (or the upper wall 41 and the lateral wall 43 separately) may be cut to a length of 10 inches to accommodate 12 inches on center joint spacing or 14 inches to accommodate 16 inches on center joint spacing. Each joist is approximately 2 inches thick. After the angle bar 40 is cut to the desired length, the side plates 42 may be welded to each end of the angle bar 40.

[0030] According to an embodiment, the post blocking assembly 22 also includes a weld nut 34 welded to each side plate 42. The weld nut 34 includes a threaded female portion that receives and engages with the threads of the bolt 32. Each side plate 42 also includes an anti-rotation hole 38. The anti-rotation hole 38 is disposed offset both horizontally and vertically from the bolt receiving through hole 28 formed in the same side plate 42. Each bolt receiving through hole 28 is aligned with the threaded female portion of the weld nut 34. The anti-rotation hole 38 is disposed on the side plate 42 in a location to oppose a perpendicular force outward on the railing post 18 to prevent rotation of the post blocking assembly 22 from the torque created by the perpendicular force applied to the railing post 18.

[0031] According to an embodiment, the angle bar 40 may be extruded and cut to length. The extrusion allows a generally squared outer edge and a rounded inner edge 45 at the junction of the upper wall 41 and the lateral wall 43 of the angle bar 40.

[0032] FIG. 5 illustrates an alternate embodiment of the post blocking assembly 22 with features as described above with respect to FIG. 4, with the exception that the angle bar 40 is formed by bending a piece of sheet metal to form the upper wall 41 and the lateral wall 43. Bending the sheet metal, such as by brake forming or other suitable sheet metal forming method, creates a rounded outer edge 47 at the junction of the upper wall 41 and the lateral wall 43. An inner surface 49 at this junction is also rounded.

[0033] FIG. 6 is a perspective view of an alternate embodiment of the post blocking assembly 22 with features as described above with respect to FIG. 4, with the exception that the angle bar 40 is formed of separate pieces of sheet metal that are welded together at a right angle. The weld may be any suitable weld, such as a stitch metal inert gas (MIG) weld and the like.

[0034] The side plates include a chamfer 44 disposed at a corner of the side plate 42 proximate the junction of the upper wall 41 and the lateral wall 43 of the angle bar 40. This chamfer 44 facilitates placement of the side plates and provides clearance for a stitch weld or an internal bend radius.

[0035] FIG. 7 is a perspective view of another technique of blocking for a railing support post, such as the railing support post 18 shown in FIG. 1. A post blocking joist 46 is supported by a post blocking support bracket 48. FIG. 8 is a perspective view of the post blocking support bracket 48, which includes a blocking joist support wall 50 and a pair of opposed sidewalls 52. The post blocking joist support wall 50 includes a plurality of through holes 54 formed along its length. The holes 54 disposed at each end of the blocking joist support wall 50 receive screws 51. The holes 54 disposed between the screw receiving through holes permit drainage.

[0036] The post blocking support bracket 48 is secured to the underside of the support joists 16 using self-tapping sheet metal screws 51. A post blocking joist 46 is cut to be supported by the support bracket 48 and disposed between the bracket 48 and the deck surface 12. The support joists may be set at 12 or 16 inches center-to-center. The post blocking joist 46 is positioned and set between the side walls 52 of the post blocking support bracket 48. Screws 51 are inserted through the screw receiving through holes 54 and through each of the adjacent support joists 16. The top surface of the post blocking joist 46 is generally flush with the top surface of the support joists 16. The post base 20 supporting the railing support post 18 is secured to the post blocking support bracket with bolts 60 and nuts 62. For example, the bolts may be used after drilling holes through the deck surface 12 and the perimeter support member 14 and the support bracket 48 to receive the bolts 60. Washers and nuts 62 may be secured to the end of the bolts 60 extending through the

underside of the perimeter support member **14** and the support bracket **48**. According to an embodiment, $\frac{3}{8}$ inch×8 inch galvanized bolts secured with nuts and washers may be used as described above with respect to FIG. **1**.

[0037] The bolts **60** may or may not be received through the hollow blocking joist **46**. The blocking joist **46** provides additional support to allow the bolts **60** to be received through the deck surface **12** and tightened to the bracket **48** using the nuts **62**.

[0038] Reference is made to FIG. **9**, which is a perspective view of a post blocking support bracket **55**, which is an alternate embodiment of the post blocking support bracket **48** and includes a pair of flanges **56** extending perpendicularly from each end a side wall **52**. This post blocking support bracket **55** includes the features described above with respect to FIGS. **7** and **8**. A through hole **58** may be formed through each flange **56**. A bolt (or screw) may be received through each through hole **58** and through the side walls of the support joists **16** to provide increased strength of the attachment of the bracket **55** to the joists **16**.

[0039] As used herein, the terms “approximately,” “about,” “substantially”, and similar terms are intended to have a broad meaning in harmony with the common and accepted usage by those of ordinary skill in the art to which the subject matter of this disclosure pertains. It should be understood by those of skill in the art who review this disclosure that these terms are intended to allow a description of certain features described and claimed without restricting the scope of these features to the precise numerical ranges provided. Accordingly, these terms should be interpreted as indicating that insubstantial or inconsequential modifications or alterations of the subject matter described and claimed are considered to be within the scope of the disclosure as recited in the appended claims.

[0040] It should be noted that the term “exemplary” and variations thereof, as used herein to describe various embodiments, are intended to indicate that such embodiments are possible examples, representations, or illustrations of possible embodiments (and such terms are not intended to connote that such embodiments are necessarily extraordinary or superlative examples).

[0041] The term “or,” as used herein, is used in its inclusive sense (and not in its exclusive sense) so that when used to connect a list of elements, the term “or” means one, some, or all of the elements in the list. Conjunctive language such as the phrase “at least one of X, Y, and Z,” unless specifically stated otherwise, is understood to convey that an element may be either X, Y, Z; X and Y; X and Z; Y and Z; or X, Y, and Z (i.e., any combination of X, Y, and Z). Thus, such conjunctive language is not generally intended to imply that certain embodiments require at least one of X, at least one of Y, and at least one of Z to each be present, unless otherwise indicated.

[0042] References herein to the positions of elements (e.g., “top,” “bottom,” “above,” “below”) are merely used to describe the orientation of various elements in the figures. It should be noted that the orientation of various elements may differ according to other exemplary embodiments, and that such variations are intended to be encompassed by the present disclosure.

[0043] Although the figures and description may illustrate a specific order of method steps, the order of such steps may differ from what is described, unless specified differently above. Also, two or more steps may be performed concurrently or with partial concurrence, unless specified differently above. All such variations are within the scope of the disclosure.

[0044] It is important to note that the construction and arrangement of the assemblies as shown in the various exemplary embodiments is illustrative only. Additionally, any element disclosed in one embodiment may be incorporated or utilized with any other embodiment disclosed herein.

Although only one example of an element from one embodiment that can be incorporated or utilized in another embodiment has been described above, it should be appreciated that other elements of the various embodiments may be incorporated or utilized with any of the other embodiments disclosed herein.

Claims

1. A deck frame, comprising: at least one perimeter support member supporting a plurality of support joists; and a post blocking assembly disposed between adjacent ones of the plurality of support joists and supporting a railing post, the post blocking assembly comprising an angle bar, a first side plate secured to a first end of the angle bar and a second side plate secured to a second end of the angle bar opposite the first end, a first nut in threaded engagement with a first bolt extending through the first side plate and a second nut in threaded engagement with a second bolt extending through the second side plate, the first side plate defining a first anti-rotation through hole and the second side plate defining a second anti-rotation through hole.
2. The deck frame of claim 1 further comprising a deck surface supported by the plurality of support joists.
3. The deck frame of claim 1 wherein the first nut is welded to the first side plate and the second nut is welded to the second side plate.
4. The deck frame of claim 1 wherein the angle bar includes an upper wall and a lateral wall and the railing support post includes a base plate defining a plurality of through holes aligned with the angle bar.
5. The deck frame of claim 1 further comprising a first anti-rotation screw received by the first anti-rotation through hole and a second anti-rotation screw received by the second anti-rotation through hole.
6. A deck frame, comprising: at least one perimeter support member; a first support joist supported by the perimeter support member; a second support joist supported by the perimeter support member; and a post blocking assembly supporting a railing post, the post blocking assembly disposed between the first support joist and the second support joist and comprising an angle bar, a first side plate secured to a first end of the angle bar and a second side plate secured to a second end of the angle bar opposite the first end, a first weld nut in threaded engagement with a first bolt extending through the first side plate and a second weld nut in threaded engagement with a second bolt extending through the second side plate, the first side plate defining a first anti-rotation through hole and the second side plate defining a second anti-rotation through hole, the post blocking assembly further comprising a first anti-rotation screw received by the first anti-rotation through hole and a second anti-rotation screw received by the second through hole.
7. The deck frame of claim 6 wherein the angle bar comprises an upper wall welded to a lateral wall.
8. The deck frame of claim 6 wherein the angle bar is extruded.
9. The deck frame of claim 6 wherein a piece of sheet metal is bent approximately 90 degrees to form an upper wall and a lateral wall of the angle bar, the angle bar further comprising a rounded inner edge disposed at a junction of the upper wall and the lateral wall.
10. The deck frame of claim 9 wherein the angle bar further comprises a rounded outer edge disposed at a junction of the upper wall and the lateral wall.
11. The deck frame of claim 6 wherein the angle bar includes an upper wall and a lateral wall and the railing support post includes a base plate defining a plurality of through holes aligned with the upper wall.
12. A post blocking assembly, comprising: an angle bar comprising an upper wall and a lateral wall disposed generally orthogonally to the upper wall; a first side plate secured to the angle bar, the first side plate defining a first bolt receiving through hole and a first anti-rotation through hole; a second side plate secured to the angle bar opposite the first side plate and defining a second bolt receiving through hole and a second anti-rotation through hole; a first weld nut secured to the first side plate and aligned with the first bolt receiving through hole; and a second weld nut secured to the second side plate and aligned with the second bolt receiving through hole.

- 13.** The post blocking assembly of claim 12 wherein the upper wall is welded to the lateral wall.
 - 14.** The post blocking assembly of claim 12 wherein the upper wall and the lateral wall are portions of an extrusion.
 - 15.** The post blocking assembly of claim 12 wherein the first side plate is welded to the angle bar and the second side plate is welded to the angle bar.
 - 16.** The post blocking assembly of claim 12 wherein the first side plate includes a chamfer.
 - 17.** The post blocking assembly of claim 12 wherein the first anti-rotation through hole is offset vertically and horizontally from the first bolt receiving through hole.
 - 18.** The post blocking assembly of claim 12 wherein the angle bar is formed of steel.
 - 19.** The post blocking assembly of claim 18 wherein the steel has a thickness of approximately 0.25 inches.
 - 20.** The post blocking assembly of claim 12 wherein the angle bar comprises a rounded inner edge disposed at a junction of the upper wall and the lateral wall.
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