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(54) **INTERNAL COMPRESSION MOUNT FOR HOLLOW POSTS**

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Related U.S. Application Data

(60) Provisional application No. 60/334,383, filed on Nov. 29, 2001.

(57) **ABSTRACT**

An internal compression mount for attaching hollow posts to a base surface. A substantially "I" shaped post mount is fixedly attached to a bottom plate. The bottom plate and post mount may be leveled on the base surface with shims and leveling bolts. Threaded shafts may be inserted through a top plate, through the post mount, through the bottom plate, the base surface and through a mounting plate. The threaded shafts receive nuts, which are tightened to produce a compressive force on the post mount between the top plate and the mounting plate below the base surface. The compressive force between the base of the post mount and the mounting plate grasps the base surface in a vice like manner and securely affixes the post mount to the base surface. A hollow post can then slide in place over the post mount.

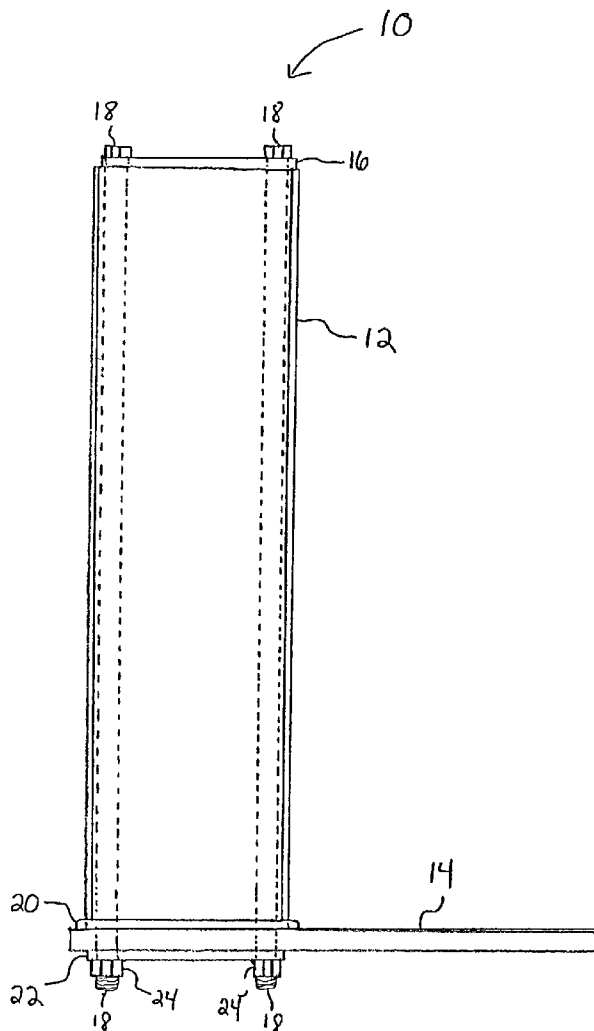


FIG. 1

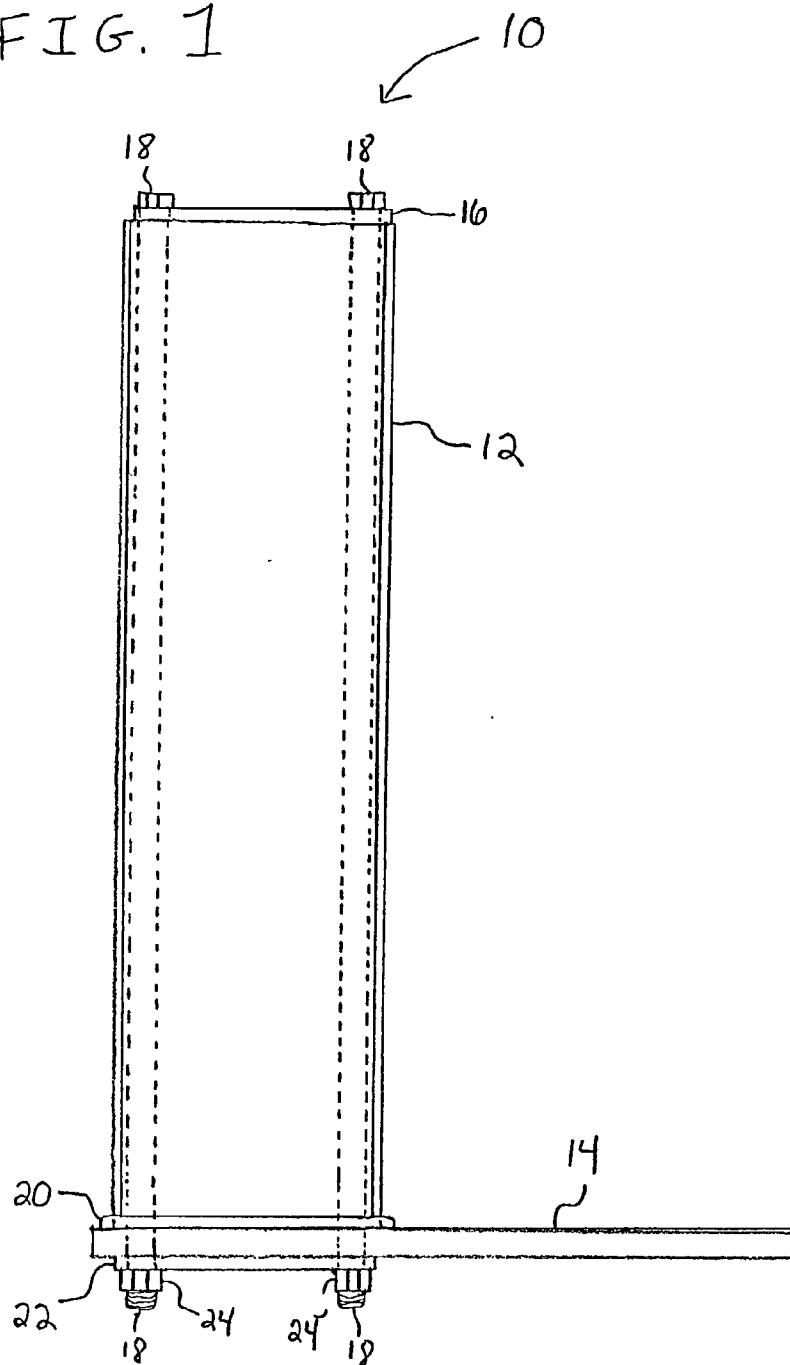


FIG. 2

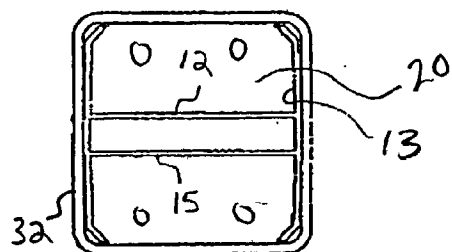


FIG. 3

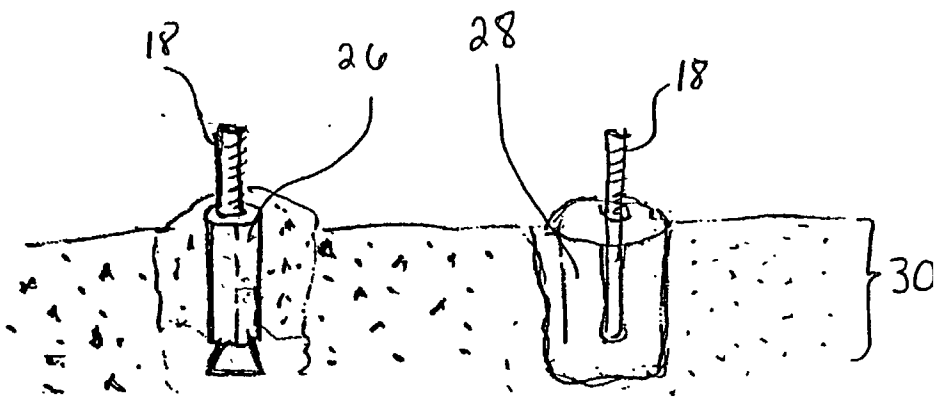
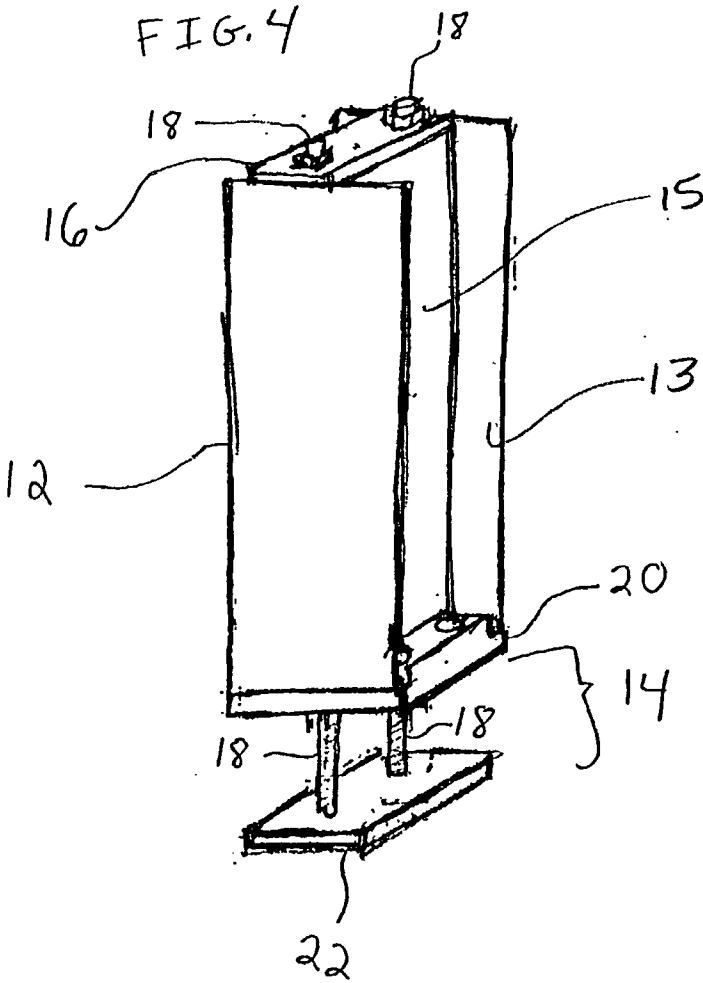
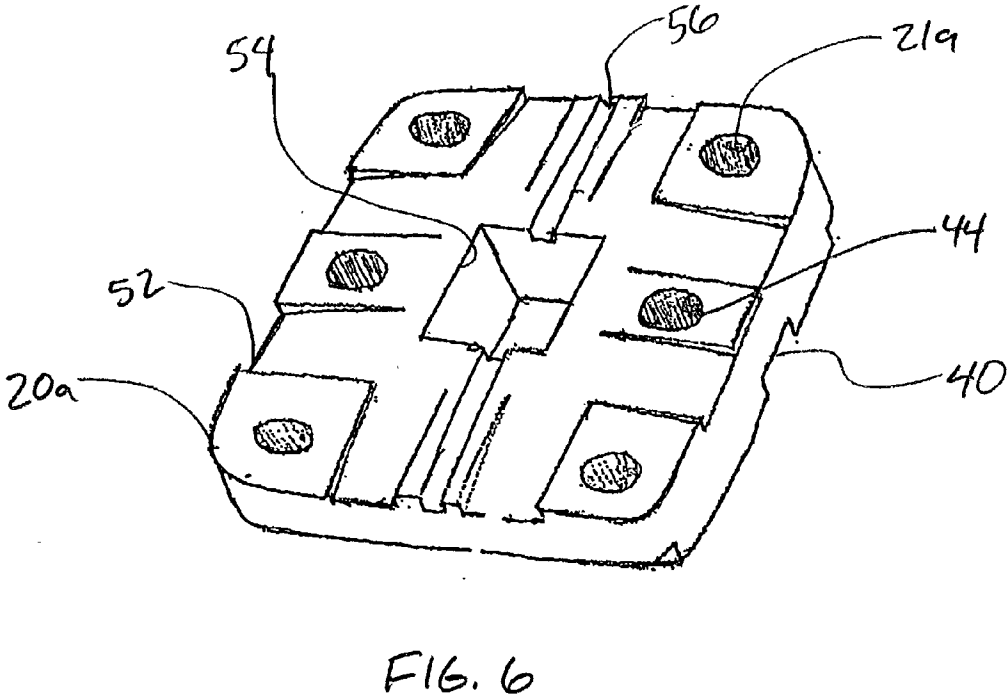
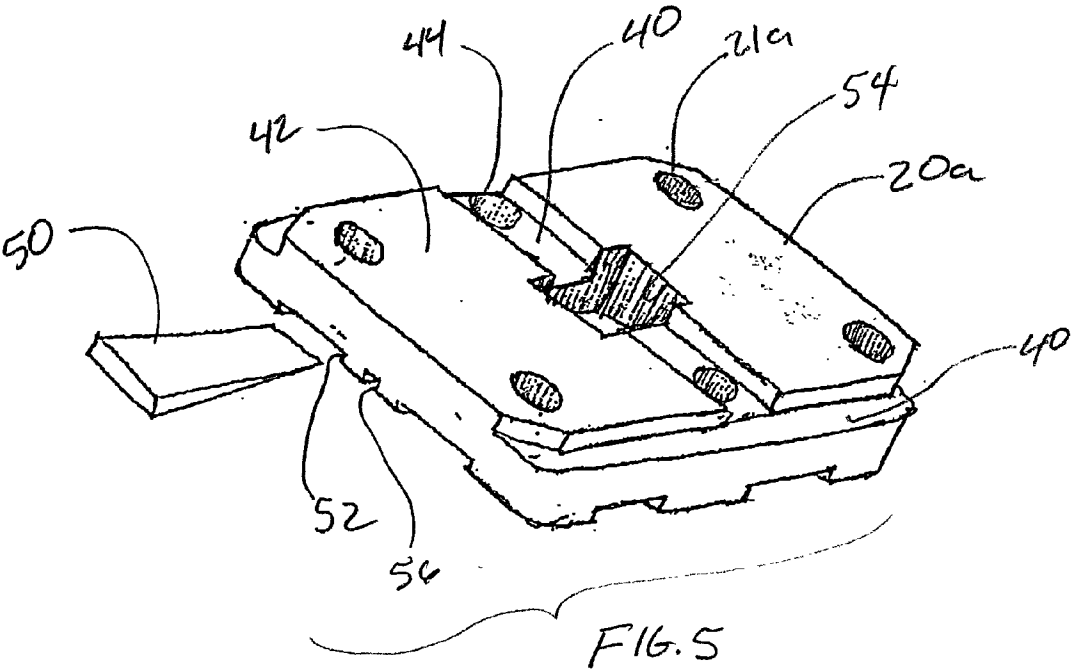


FIG. 4





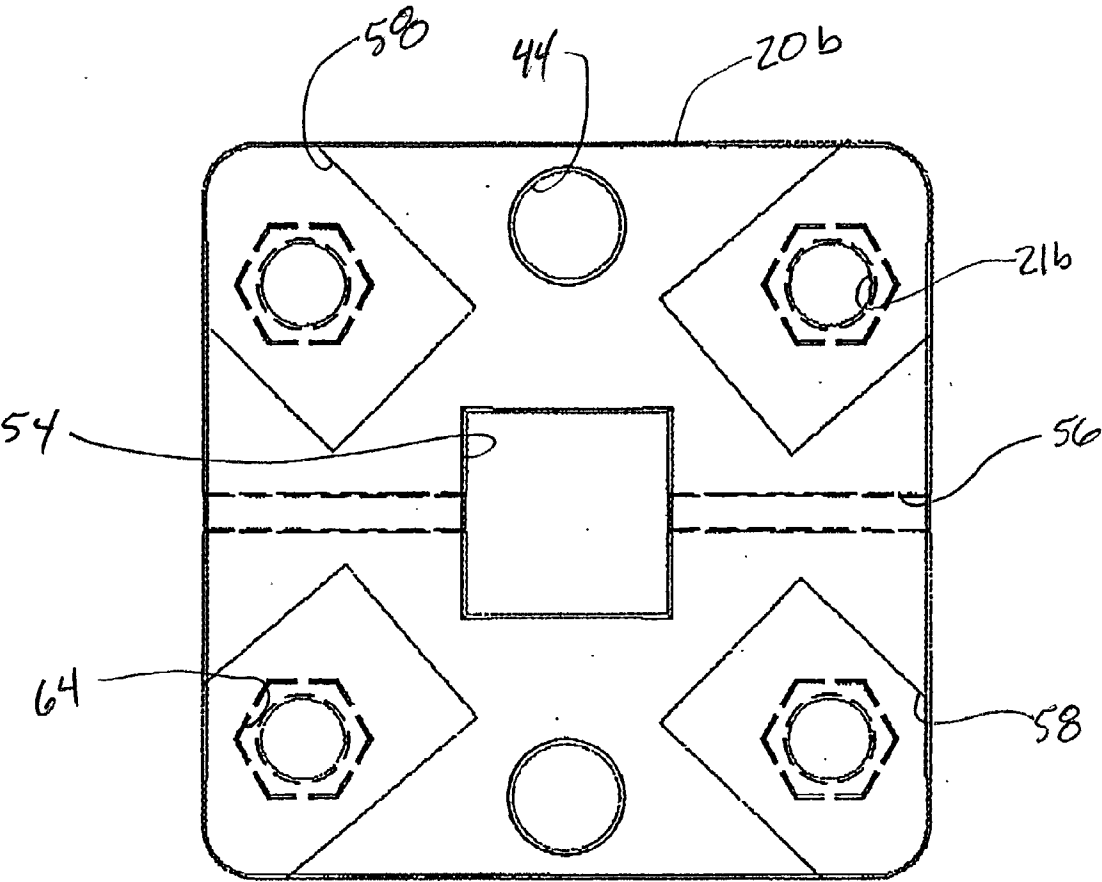


FIG. 7

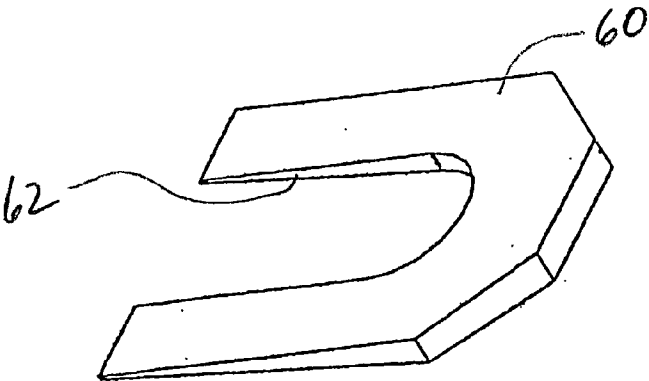


FIG. 8

INTERNAL COMPRESSION MOUNT FOR HOLLOW POSTS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 60/334,383, filed Nov. 29, 2001, which is hereby incorporated by reference herein in its entirety, including but not limited to those portions that specifically appear hereinafter, the incorporation by reference being made with the following exception: In the event that any portion of the above-referenced provisional application is inconsistent with this application, this application supercedes said above-referenced provisional application.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not Applicable.

BACKGROUND OF THE INVENTION

[0003] 1. The Field of the Invention

[0004] The present invention relates generally to post mounting devices, and more particularly, but not necessarily entirely, to an internal compression mount system for hollow posts.

[0005] 2. Description of Related Art

[0006] Traditionally wooden posts were mounted to a deck by notching the bottom of the post to receive a joist of the deck. The use of plastic and other composite materials for the production of fence products led to the use of hollow fence posts made from the composite materials. However, the hollow configuration of composite fence posts makes them difficult to mount on a flat surface such as a deck or concrete.

[0007] A number of hollow fence post mounting systems have been developed. However, the prior art mounting systems are characterized by systems where only the base of the system is attached to the surface. These systems are ineffective because outward forces applied near the top of the fence cause undue stress on the surface and the base of the post mount. These stresses can loosen the attachment means of the post mount systems or damage the base of the mounting system.

[0008] For example, U.S. Pat. No. 5,444,951 (granted Aug. 29, 1995 to Scott et al.) discloses a bracket to be attached to a solid surface. The bracket allows a vinyl fence post to be fitted over it and locked in place to provide a rigid post without pouring concrete in the post. The bracket is secured to the solid surface with bolts. An expansion mechanism is provided at the top of the bracket including a tensioning bolt, which when tensioned, forces the expansion mechanism to expand and grip the fence post to hold the post on the bracket. However, since the bracket is attached to the solid surface using bolts at the bottom of the bracket, the top portion of the bracket is not under compression and can therefore move more easily.

[0009] Other attempts have been made to address the drawbacks in the prior art. For example, U.S. Pat. No. 6,141,928 (granted Nov. 7, 2000 to Platt) discloses a post mount for affixing a post having a cavity to a floor. The post

mount is bolted to the floor using bolts and compression pins. A bolt extends through the center of the post mount, passes through the floor and is secured to the floor with a nut. The post mount is then inserted into the cavity of the post to affix the post to the floor. However, the post mount is designed with a pair of fins at each corner that contact the post in a manner that concentrates loads along the fins.

[0010] The prior art is thus characterized by several disadvantages that are addressed by the present invention. The present invention minimizes, and in some aspects eliminates, the above-mentioned failures, and other problems, by utilizing the methods and structural features described herein.

[0011] The features and advantages of the invention will be set forth in the description which follows, and in part will be apparent from the description, or may be learned by the practice of the invention without undue experimentation. The features and advantages of the invention may be realized and obtained by means of the instruments and combinations particularly pointed out in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The features and advantages of the invention will become apparent from a consideration of the subsequent detailed description presented in connection with the accompanying drawings in which:

[0013] **FIG. 1** is a side view of a compression mount for hollow posts attached to a base surface in accordance with the principles of the present invention;

[0014] **FIG. 2** is a top view of a compression mount and a hollow post in accordance with the principles of the present invention;

[0015] **FIG. 3** is a side, break-away cross-sectional view of an alternative embodiment of the compression mount of **FIG. 1**;

[0016] **FIG. 4** is a perspective view of a compression mount for hollow posts of **FIG. 1**;

[0017] **FIG. 5** is a top perspective view of one embodiment of a bottom plate and shim;

[0018] **FIG. 6** is a bottom perspective view of the bottom plate of **FIG. 5**;

[0019] **FIG. 7** is a bottom view of an alternative embodiment bottom plate; and

[0020] **FIG. 8** is a perspective view of an alternative embodiment shim.

DETAILED DESCRIPTION OF THE INVENTION

[0021] For the purposes of promoting an understanding of the principles in accordance with the invention, reference will now be made to the embodiments illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended. Any alterations and further modifications of the inventive features illustrated herein, and any additional applications of the principles of the invention as illustrated herein, which would normally occur to one skilled in the relevant art and having possession of this disclosure, are to be considered within the scope of the invention claimed.

[0022] It must be noted that, as used in this specification and the appended claims, the singular forms “a,” “an,” and “the” include plural referents unless the context clearly dictates otherwise.

[0023] In describing and claiming the present invention, the following terminology will be used in accordance with the definitions set out below.

[0024] As used herein, “comprising,” “including,” “containing,” “characterized by,” and grammatical equivalents thereof are inclusive or open-ended terms that do not exclude additional, unrecited elements or method steps.

[0025] As used herein, “consisting of” and grammatical equivalents thereof exclude any element, step, or ingredient not specified in the claim.

[0026] As used herein, “consisting essentially of” and grammatical equivalents thereof limit the scope of a claim to the specified materials or steps and those that do not materially affect the basic and novel characteristic or characteristics of the claimed invention.

[0027] Referring now to FIG. 1, a side view is shown of a post mounting system, indicated generally at 10 in accordance with the principles of the present invention. The post mounting system 10 may include a compression mount 12 having a substantially “I” shaped cross section as shown most clearly in FIG. 2. The compression mount 12 may be configured to support loads placed upon it through a hollow post 32. It will be appreciated that the dimensions of the compression mount 12 may vary within the scope of the present invention. However, the compression mount 12 may be configured to fit snugly within the hollow post 32 and to maximize its load bearing capabilities. The compression mount 12 may have planar sidewalls 13 that provide a surface area to contact the post 32. This allows for forces to be evenly distributed over the compression mount 12 and prevents the loads from being focused on a particular area of the post 32 or the compression mount 12. The sidewalls 13 may be separated by a brace portion 15. The brace portion 15 may extend in a direction substantially perpendicular to the sidewalls 13 and may define a cavity 17 for receiving shafts 18.

[0028] The compression mount 12 may be rigidly attached to a bottom plate 20. The bottom plate 20 may be attached to the compression mount 12 by any manner known to those skilled in the art such as welding or by forming the bottom plate 20 integrally with the compression mount 12. The bottom plate 20 may include openings 21 for receiving leveling bolts (not shown) to enable the compression mount 12 to be properly leveled on the base 14. Other leveling devices such as shims (not shown) may be used to level the bottom plate 20 with respect to the base 14. The base 14 may be a floor or deck for example, or any other structure to which a post 32 is to be securely attached.

[0029] The post mounting system 10 may also include a top plate 16 for attaching to a top of the compression mount 12. The top plate 16 may include openings for receiving shafts 18 on opposing sides of the compression mount 12. Shafts 18 may be dimensioned to extend the entire length of the compression mount 12, and may be threaded to receive nuts 24 thereon. The number and position of the shafts 18 may be configured to provide beneficial strength characteristics for the compression mount 12. However, it will be

appreciated by those skilled in the art that the shafts 18 may be provided in different quantities and locations within the scope of the present invention.

[0030] The post mounting system 10 may also include a mounting plate 22 configured to be mounted beneath the compression mount 12. The mounting plate 22 may include openings to receive the shafts 18 and may provide support for the nuts 24 to prevent the nuts 24 from becoming embedded in the base 14.

[0031] FIG. 4 shows a perspective view of a post mounting system 10 in an assembled condition with a gap where the base 14 may be positioned. In use, holes may be drilled into the base 14 to accommodate the shafts 18. The shafts 18 may be inserted through the top plate 16, through the entire length of the compression mount 12, through the bottom plate 20, through the base 14 and the mounting plate 22. Nuts 24 may be secured on the end of the shafts 18 and tightened such that the shafts 18 may be drawn into the nuts 24 and the compression mount 12 may be placed in compression and secured to the base 14. Nuts 24 may be of the locking variety to prevent the shafts 18 from becoming loosened. The post mounting system 10 may be leveled by adjusting bolts inserted through the openings 21 in the bottom plate 20 or by inserting shims between the base 14 and the bottom plate. A hollow post 32 may be slid over the compression mount 12 to position and hold the post 32 in place. Additional fasteners such as brackets or screws (not shown) may be used to secure the post 32 to the compression mount 12.

[0032] Reference will now be made to FIG. 3 to describe a second embodiment of the present invention. As previously discussed, the embodiments of the invention illustrated herein are merely exemplary of the possible embodiments of the invention, including that illustrated in FIG. 3.

[0033] It will be appreciated that the second embodiment of the invention illustrated in FIG. 3 contains many of the same structures represented in FIGS. 1, 2, and 4 and only the new or different structures will be explained to most succinctly explain the additional advantages which come with the embodiments of the invention illustrated in FIG. 3. The second embodiment of the invention shows how the post mounting system 10 may be used on a hard surface 30 such as concrete. In this embodiment, the shafts 18 may be threaded into a wedge 26 or other securing means such as epoxy 28, rather than the nuts 24. The securing means may be secured to the hard surface 30 in any manner known to those skilled in the art, such as by fasteners, adhesives, friction or expansion members for example. The tightening of the shaft 18 into the securing means in the concrete 30 provides a compression of the post mounting system 10 similar to that shown in FIG. 1.

[0034] Referring now to FIG. 5, a top perspective view of an embodiment of a bottom plate 20a is shown. The bottom plate 20a may include a groove 40 formed in the upper surface 42. The groove 40 may be configured for receiving the compression mount 12. Accordingly, the groove 40 may have a similar shape as the compression mount 12 as viewed from the top (see FIG. 2). It will be appreciated that the groove 40 may be configured to hold the compression mount 12 in place with respect to the bottom plate 20a to prevent lateral movement of the compression mount 12 with respect to the bottom plate 20a.

[0035] The bottom plate **20a** may also include a plurality of shaft openings **44** for receiving the shafts **18**, and adjustment bolt openings **21a** for receiving adjustment bolts (not shown) to level the bottom plate **20a**. Shims **50** may also be used to level the bottom plate **20a**. It will be appreciated that the shims **50** may be used in combination with the adjustment bolts, or the shims **50** may be used without the adjustment bolts, within the scope of the present invention. The shims **50** may be configured as a wedge for inserting in shim slots **52** to adjust the position of the bottom plate **20a** with respect to the base **14** so that the hollow post **32** may be installed in the desired orientation. It will be appreciated that a single shim **50** or a plurality of shims **50** may be used within the scope of the present invention to adjust the bottom plate **20a** to the desired orientation.

[0036] The bottom plate **20a** may also include a drain hole **54** passing through the bottom plate **20a**. The drain hole **54** may allow moisture to be drained so that water does not accumulate on top of the bottom plate **20a** within the hollow post **32**. This allows the mounting system **10** to function without problems such as undue warping or deterioration that may be caused by water accumulation. Moreover, the bottom plate **20a** may also include seepage channels **56** to transport the water from the drain hole **54** to an exterior of the bottom plate **20a**.

[0037] Referring now to **FIG. 7**, a top view of a further alternative embodiment bottom plate **20b** is shown. As previously discussed, the embodiments of the invention illustrated herein are merely exemplary of the possible embodiments of the invention, including that illustrated in **FIG. 7**. The bottom plate **20b** may have corner shim slots **58** encompassing adjustment bolt openings **21b**. The position of the corner shim slots **58** at the corners of the bottom plate **20b** may facilitate leveling of the bottom plate **20b**. A slotted shim **60**, as best shown in **FIG. 8**, may be inserted into the corner shim slots **58** to level the bottom plate **20b**. The slotted shim **60** may have a shim slot **62** for providing a space for the adjusting bolts to be passed. Accordingly, the slotted shim **60** may be used at the corners of the bottom plate **20b** without interference with the adjusting bolts, and fewer slotted shims **60** may be required to level the bottom plate **20b** as compared to other embodiments.

[0038] The embodiment of the bottom plate **20b** shown in **FIG. 7** may also include polygonal openings **64** for receiving polygonal heads of adjustment bolts. However, it will be appreciated that the bottom plate **20b** may have openings of various different configurations to be compatible with any variety of adjustment bolts known in the art.

[0039] It will be appreciated that the structure and apparatus disclosed herein is merely one example of a means for securing the shaft to the base, and it should be appreciated that any structure, apparatus or system for securing the shaft to the base which performs functions the same as, or equivalent to, those disclosed herein are intended to fall within the scope of a means for securing the shaft to the base, including those structures, apparatus or systems for securing the shaft to the base which are presently known, or which may become available in the future. Anything which functions the same as, or equivalently to, a means for securing the shaft to the base falls within the scope of this element.

[0040] In accordance with the features and combinations described above, a method of attaching a post to a base includes the steps of:

[0041] (a) drilling a plurality of holes in the base;

[0042] (b) passing a plurality of shafts through a compression mount member and through the plurality of holes in the base;

[0043] (c) tightening a securing member on the shafts to secure the compression mount member to the base and place the compression mount member in compression; and

[0044] (d) sliding a post over the compression mount member.

[0045] In view of the foregoing, it will be appreciated that the present invention provides a post mount device which slidably receives a hollow post. The present invention also provides a post mount device in which the top and bottom of the device are mounted to the mounting surface, such that even the top of the post mount device is under compressive forces. The present invention also provides a post mount device which is self leveling for attachment to a flat surface and which allows for even distribution of loads to the post.

[0046] It is to be understood that the above-described arrangements are only illustrative of the application of the principles of the present invention. Numerous modifications and alternative arrangements may be devised by those skilled in the art without departing from the spirit and scope of the present invention and the appended claims are intended to cover such modifications and arrangements. Thus, while the present invention has been shown in the drawings and described above with particularity and detail, it will be apparent to those of ordinary skill in the art that numerous modifications, including, but not limited to, variations in size, materials, shape, form, function and manner of operation, assembly and use may be made without departing from the principles and concepts set forth herein.

What is claimed is:

1. A mounting system for mounting a hollow post on a base, said mounting system comprising:

a compression mount, said compression mount comprising a pair of sidewalls separated by a brace portion, said brace portion extending in a direction substantially perpendicular to the sidewalls and defining a cavity;

a plurality of shafts passing through said cavity in said compression mount;

wherein said mounting system is configured such that said plurality of shafts can be used to compress said compression mount against said base such that said hollow post can be installed over said compression mount to attach said hollow post on said base.

2. The mounting system of claim 1, further comprising a top plate positioned on a top of said compression mount.

3. The mounting system of claim 1, further comprising a bottom plate positioned on the bottom of said compression mount.

4. The mounting system of claim 3, wherein said bottom plate comprises a groove for receiving said compression mount.

5. The mounting system of claim 3, wherein said bottom plate comprises a plurality of adjustment bolt openings for receiving adjustment bolts to adjust the orientation of said mounting system.

6. The mounting system of claim 3, wherein said bottom plate comprises a drain hole for allowing water to pass through said bottom plate.

7. The mounting system of claim 6, wherein said bottom plate further comprises a seepage channel in communication with said drain hole.

8. The mounting system of claim 3, wherein said bottom plate comprises a shim slot for receiving a shim to adjust the orientation of said mounting system.

9. The mounting system of claim 1, further comprising a mounting plate for attachment to an underside of the base.

10. The mounting system of claim 1, wherein said plurality of shafts comprise threads, and wherein nuts are disposed on said threads such that when said nuts are tightened, a compressive force is applied to said compression mount.

11. A mounting system for mounting a hollow post on a base, said mounting system comprising:

a compression mount;

at least one shaft passing through said compression mount; and

a bottom plate positioned on a bottom of said compression mount, said bottom plate having a groove configured for receiving said compression mount therein to prevent lateral movement of said compression mount with respect to said bottom plate;

wherein said bottom plate is configured to be positioned on said base and said at least one shaft is configured to compress said compression mount against said base such that said hollow post can be installed over said compression mount to attach said hollow post on said base.

12. The mounting system of claim 11, further comprising a top plate positioned on a top of said compression mount.

13. The mounting system of claim 11, wherein said bottom plate comprises a plurality of adjustment bolt openings for receiving adjustment bolts to adjust the orientation of said mounting system.

14. The mounting system of claim 11, wherein said bottom plate comprises a drain hole for allowing water to pass through said bottom plate.

15. The mounting system of claim 14, wherein said bottom plate further comprises a seepage channel in communication with said drain hole.

16. The mounting system of claim 11, wherein said bottom plate comprises a shim slot for receiving a shim to adjust the orientation of said mounting system with respect to said base.

17. The mounting system of claim 11, further comprising a mounting plate for attachment to an underside of the base.

18. The mounting system of claim 11, wherein said at least one shaft comprise threads, and wherein a nut is disposed on said threads such that when said nut is tightened, a compressive force is applied to said compression mount.

19. The mounting system of claim 11, wherein said compression mount comprises a pair of spaced apart planar walls.

20. The mounting system of claim 19, wherein said compression mount further comprises a brace portion supporting said pair of spaced apart planar walls, said brace portion extending in a direction substantially perpendicular to said pair of spaced apart planar walls.

21. The mounting system of claim 20, wherein said brace portion defines a cavity for receiving said at least one shaft.

22. A mounting system for mounting a hollow post on a base, said mounting system comprising:

a compression mount;

at least one shaft passing through said compression mount; and

a bottom plate positioned on a bottom of said compression mount, said bottom plate having at least one shim slot for receiving a shim to adjust the orientation of said bottom plate with respect to said base;

wherein said bottom plate is configured to be positioned on said base and said at least one shaft is configured to compress said compression mount against said base such that said hollow post can be installed over said compression mount to attach said hollow post on said base.

23. The mounting system of claim 22, further comprising a top plate positioned on a top of said compression mount.

24. The mounting system of claim 22, wherein said bottom plate comprises a plurality of adjustment bolt openings for receiving adjustment bolts to adjust the orientation of said mounting system with respect to said base.

25. The mounting system of claim 22, wherein said bottom plate comprises a drain hole for allowing water to pass through said bottom plate.

26. The mounting system of claim 25, wherein said bottom plate further comprises a seepage channel in communication with said drain hole.

27. The mounting system of claim 22, further comprising a mounting plate for attachment to an underside of the base.

28. The mounting system of claim 22, wherein said at least one shaft comprise threads, and wherein a nut is disposed on said threads such that when said nut is tightened, a compressive force is applied to said compression mount.

29. The mounting system of claim 22, wherein said compression mount comprises a pair of spaced apart planar walls.

30. The mounting system of claim 29, wherein said compression mount further comprises a brace portion supporting said pair of spaced apart planar walls, said brace portion extending in a direction substantially perpendicular to said pair of spaced apart planar walls.

31. The mounting system of claim 30, wherein said brace portion defines a cavity for receiving said at least one shaft.

32. The mounting system of claim 22, further comprising a wedge threadably attached to said at least one shaft.

33. A mounting system for mounting a hollow post on a base, said mounting system comprising:

a compression mount, said compression mount comprising a pair of sidewalls separated by a brace portion, said brace portion extending in a direction substantially perpendicular to the sidewalls and defining a cavity;

a plurality of shafts passing through said cavity in said compression mount;

a bottom plate positioned on a bottom of said compression mount;

a top plate positioned on a top of said compression mount; and

a mounting plate for attachment to an underside of the base;

wherein said bottom plate comprises a groove for receiving said compression mount to prevent said compression mount from moving laterally with respect to said bottom plate;

wherein said bottom plate further comprises a plurality of adjustment bolt openings for receiving adjustment bolts to adjust the orientation of said bottom plate with respect to said base;

wherein said bottom plate further comprises a plurality of shaft openings for receiving said plurality of shafts;

wherein said bottom plate further comprises at least one shim slot for receiving a shim to adjust the orientation of said bottom plate with respect to said base;

wherein said bottom plate further comprises a drain hole for allowing water to pass through said bottom plate;

wherein said bottom plate further comprises a seepage channel in communication with said drain hole;

wherein said plurality of shafts comprise threads, and wherein nuts are disposed on said threads such that when said nuts are tightened, a compressive force is applied to said compression mount;

wherein said plurality of shafts comprise two shafts;

wherein said sidewalls are spaced apart and define planar surfaces for contacting said hollow post;

wherein said mounting system is configured such that said bottom plate is adapted to be positioned on an upper side of said base, said mounting plate is adapted to be positioned on a lower side of said base, and said shafts are configured extend through said top plate, said compression mount, said bottom plate, said base and said mounting plate such that when said nuts are threadably tightened on said shafts said compression mount is compressed against said base such that said hollow post can be installed over said compression mount to attach said hollow post on said base.

34. A method for mounting a hollow post on a base, said method comprising the steps of:

(a) placing a compression mount on a bottom plate;

(b) placing said bottom plate on said base;

(c) compressing said compression mount against said base;

(d) placing at least one shim under said bottom plate to adjust an orientation of said bottom plate with respect to said base; and

(e) sliding said hollow post over said compression mount.

* * * * *