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(54) **WOOD, PLASTIC, AND METAL POST  
INSTALLATION, PROTECTION, AND  
REPLACEMENT DEVICE**

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(57) **ABSTRACT**

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A device made of metal or strong plastic that fits the portion of a post that is below ground having an open upper end, a closed lower end, and surrounding side walls with portions of the walls that go up the side of post above the ground some distance less than the length of the post above the ground (see the accompanying diagrams in Document EZMZ Drawing of Invention—FIG. 1-12). The device is dimensioned such that the open upper end has dimensions for receiving the lower end of the post therein with some slightly more significant margin of adjustment in one of the X Y axis and some less significant margin in the other X Y axis. The device fits posts of various sizes with rectangular, cylindrical and triangular shapes. The portion of the side wall that extends up the sides of the post above the ground has an array of holes for fastening the post to the device with bolts or screws. The bottom of the device has an array of holes for drainage.

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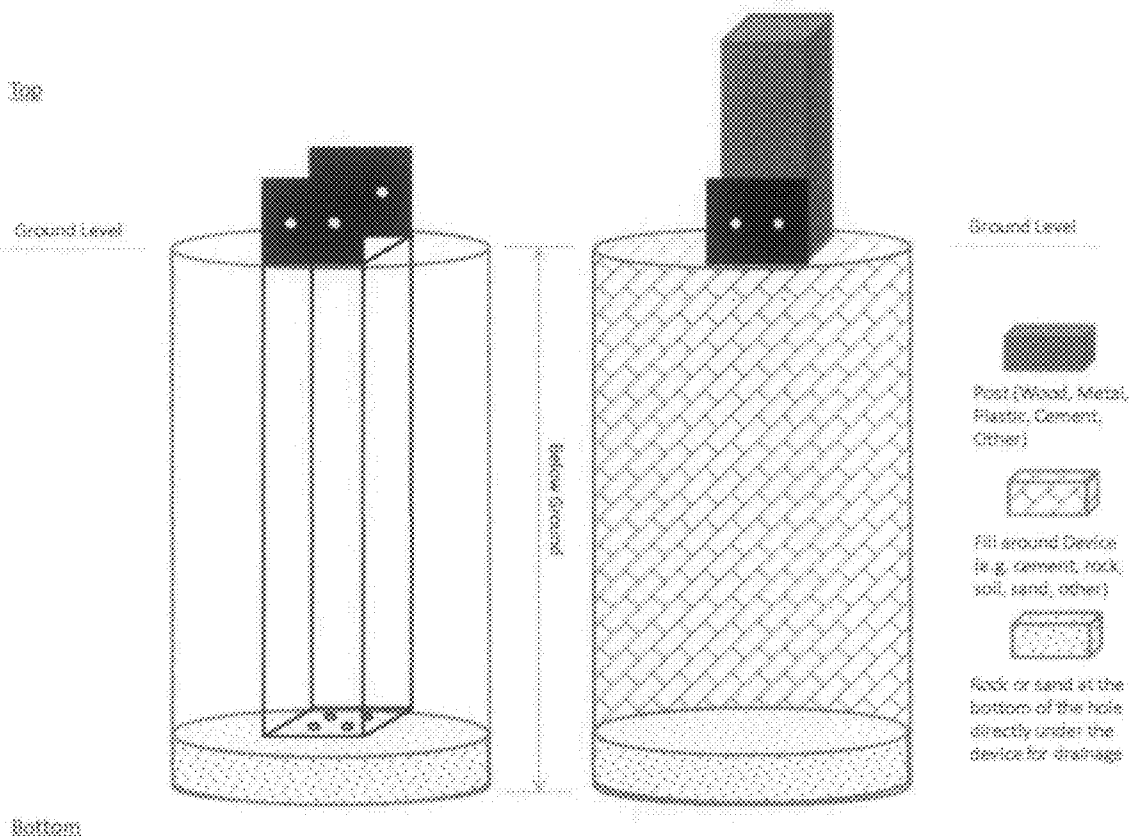
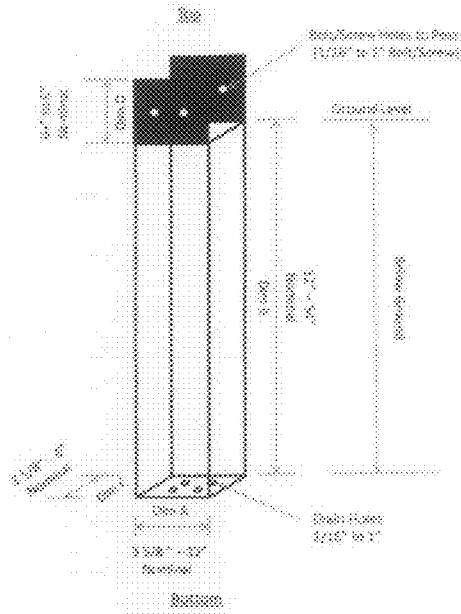


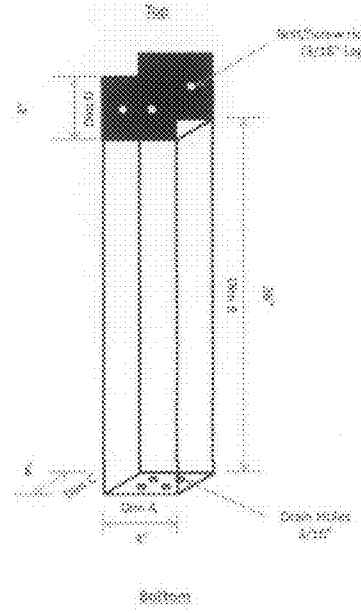
Fig. 1



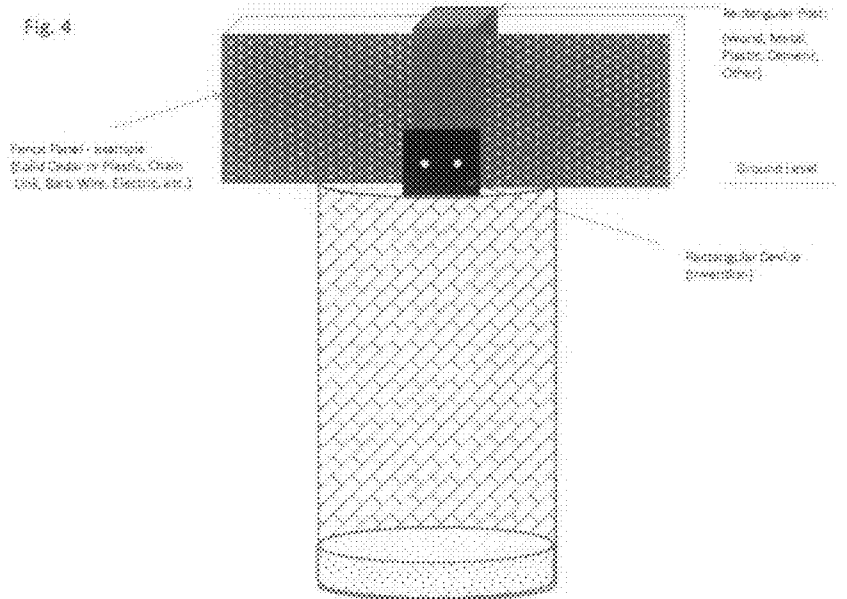
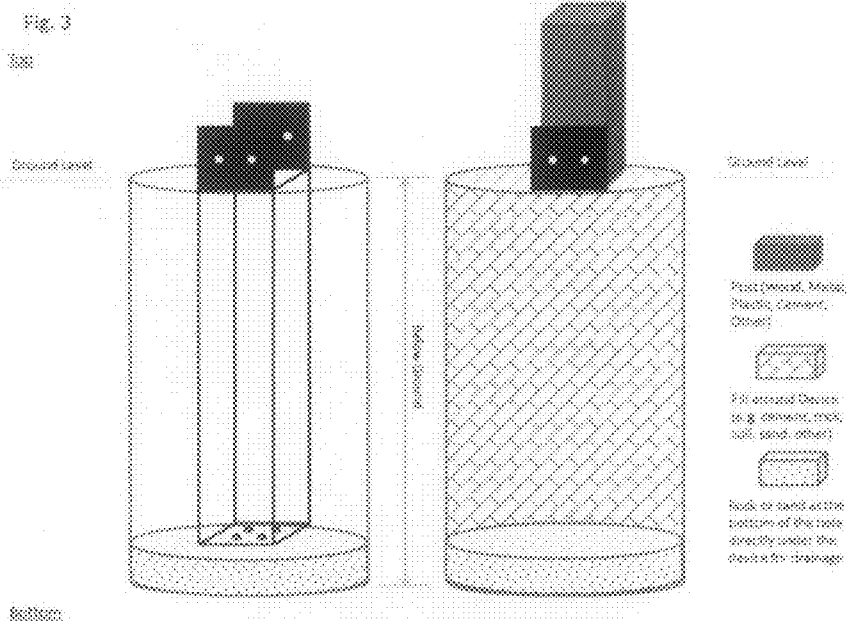
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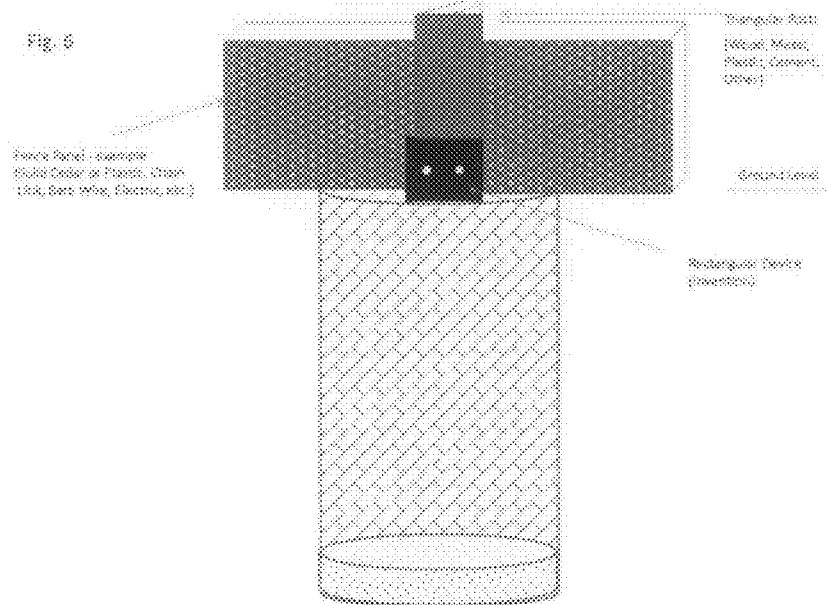
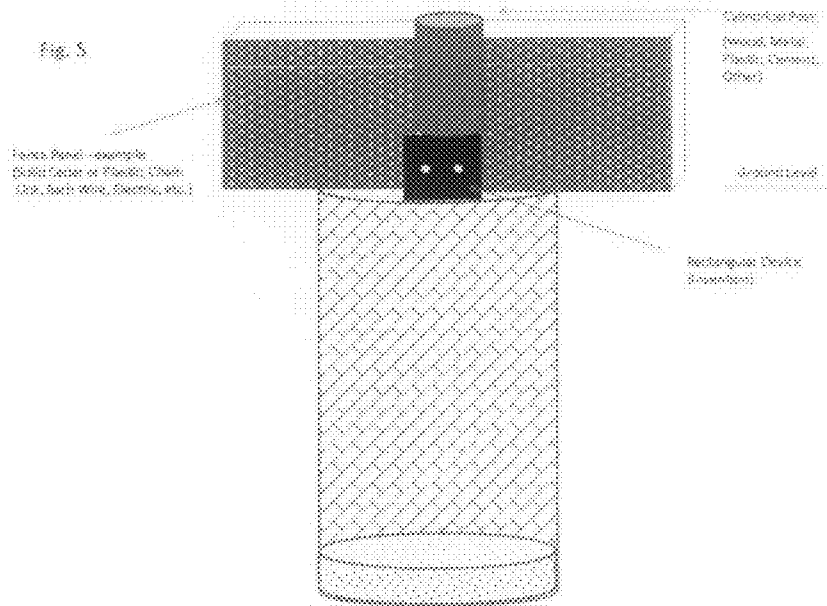
1. Dim A can be smaller or larger than shown here depending on the size of the post and (Dim D) the margin of error needed for post placement.
2. Dim B will generally be 12" to 54" in length, but could be more or less depending on the need (e.g. steel vs. soft tube, strength).
3. Dim C can be larger or smaller if post is smaller than standard lumber 4x4 or larger than 2x4 are used.
4. Dim D could be larger or smaller depending on the number of rows of holes desired and/or aesthetic appearance desired.
5. Hole holes can be added depending on the size of Dim B and Dim C (i.e. each hole approximately 1" to 2" apart from the next).
6. This device is made from either metal (e.g. steel, iron, aluminum, titanium, others) or plastic (e.g. ABS, Polycarbonate, PVC, polyurethane, polypropylene, 3-D printing plastics, others). Material thickness may range generally from 1/8" to 1", but can be thicker or thinner depending on the desired strength.

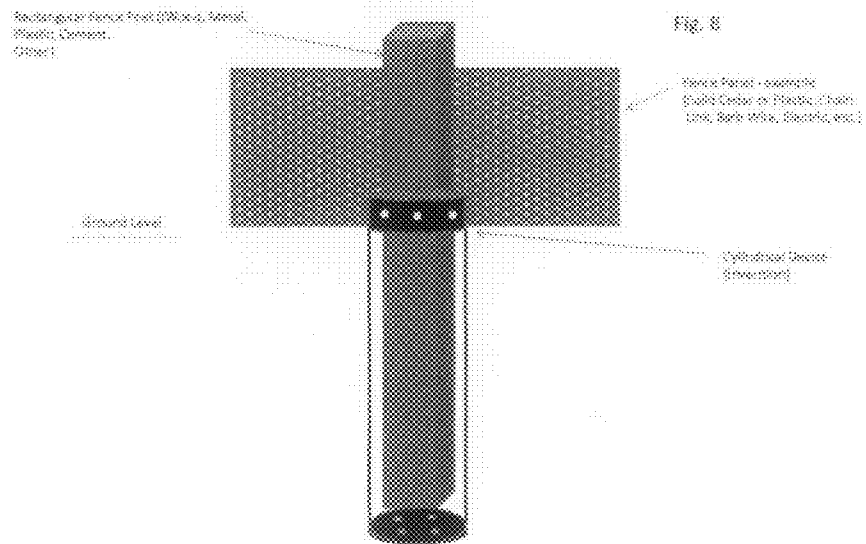
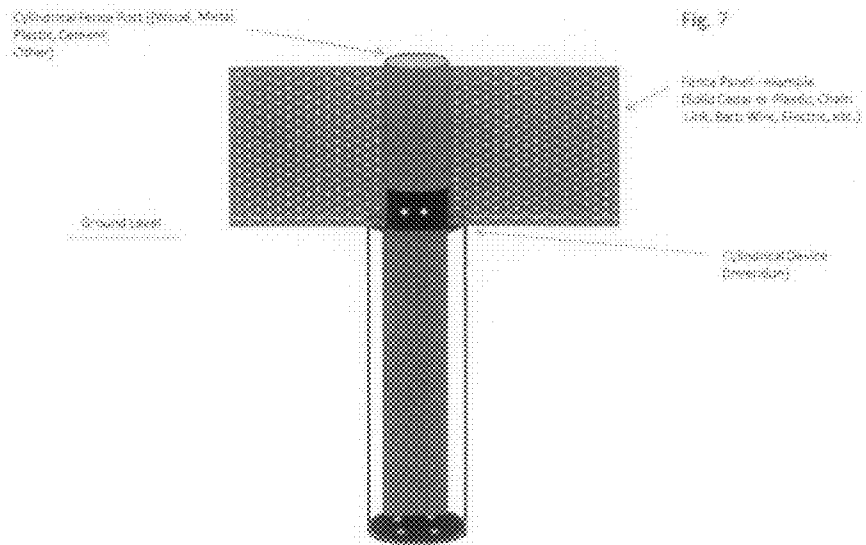
Fig. 2

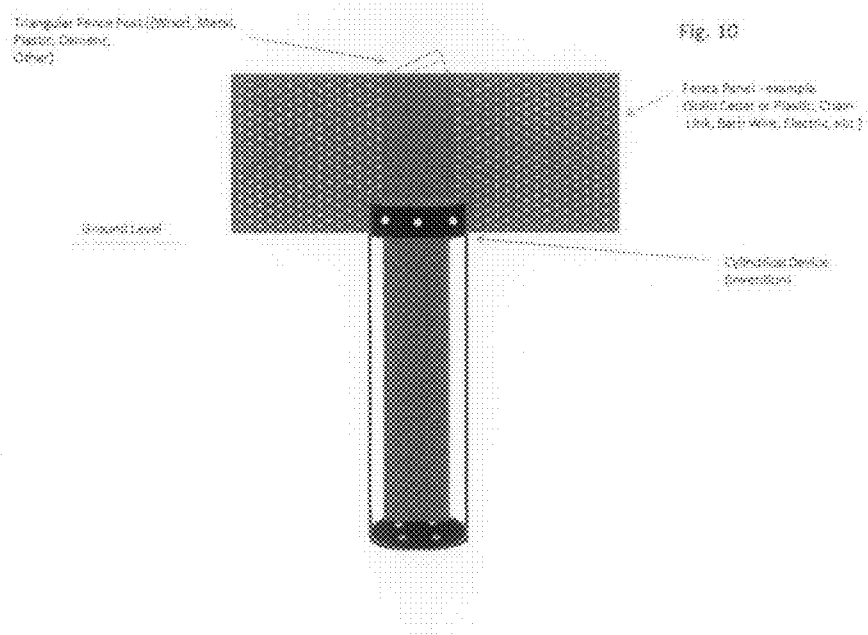
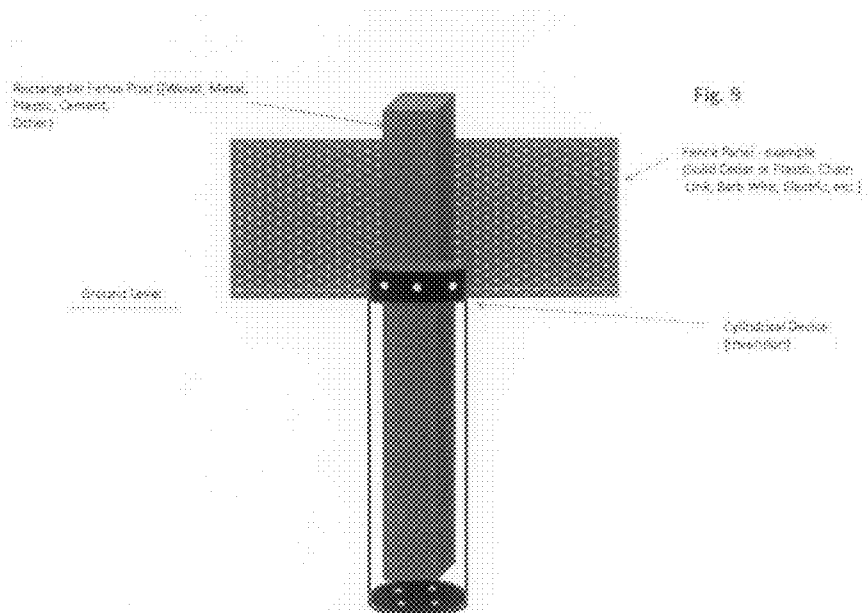


Note: Dimensions in this drawing are strictly matching the dimensions of the representative sample in the accompanying pictures of an actual example of the invention.

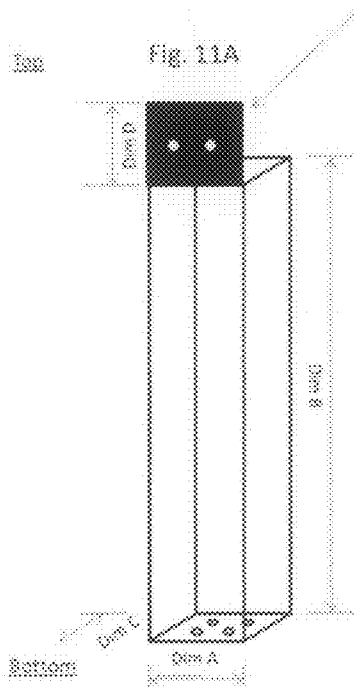




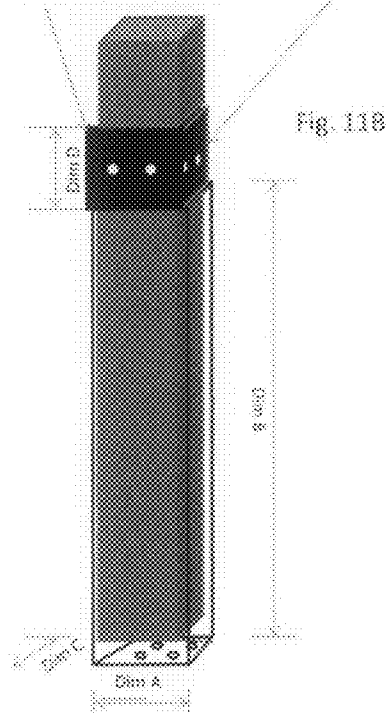




Depiction of a version of the invention (Fig. 11A): A single Dim D Ear (post attachment bracket) depending on post fixation requirements, fence panel width, and/or general aesthetics. Note: there is a corresponding design for a cylindrical version.



Depiction of a version of the invention (Fig. 11B): Two Dim D Ear Brackets for post fixation of corner posts or other. Note: there is a corresponding design for a cylindrical version depicted here, also, a 4 sided version for stack (other) posts.







**WOOD, PLASTIC, AND METAL POST INSTALLATION, PROTECTION, AND REPLACEMENT DEVICE**

**BACKGROUND OF THE INVENTION**

[0001] The present invention relates to a metal or plastic device that goes beyond prior art and products currently available in the marketplace with a novel design that provides enhanced protection from moisture induced damage such as rot in wood posts, deformation in plastic and wood posts, and oxidation in metallic and plastic posts. This Invention also goes far beyond the prior art and currently available products in the marketplace by greatly enhancing the ease, efficiency, and outcome of post Installation and replacement. The prior art mentioned below is related to post fixtures and sleeves above and below ground. This Invention was originally derived absent knowledge of the prior art listed below and is unique and novel as compared with it. The only commonality with the prior art listed below is that the inventions deal with posts and/or the device attaches in some manner to the post.

[0002] The use of support devices and protective sleeves for ground anchors is known in the prior art. By way of example, U.S. Pat. No. 5,203,317 to Klumpjan discloses a fence post bracket capable of holding the post above ground level to provide drainage and reduces deterioration. U.S. Pat. No. 5,720,134 to Kurtz discloses a support post utilizing a plastic base to prevent wood rot from moisture, U.S. Pat. No. 5,733,613 to Baecker discloses an invention utilizing a plastic sleeve to cover a wood pole to prevent deterioration. U.S. Pat. No. 6,386,296 to John and John discloses an invention that provides a plastic collar dimensioned for receiving this lower end of the wooden post that makes the claims of aiding in the protection of the lower end of a wooden post from rotting within a hole in the ground while making insertion and removal from the hole easier.

[0003] While these inventions fulfill their respective intentions and general objectives, the majority of the aforementioned patents do not describe an in-ground device that protects the post in the same technical manner as presented in this invention. U.S. Pat. No. 6,886,296 does make the claim of protecting the post with a plastic sleeve. Moisture damages posts of most materials placed in the ground. Moisture will cause some damage to posts to occur below ground level in dirt, rock, or cement. The greatest damage to posts from moisture is usually right at the interface of the post to ground or the in-ground fixture. U.S. Pat. No. 6,886,296 utilizes a plastic device that is according to the invention dimensioned for receiving the lower end of a wooden post or similar in dimension to the post. The snug fit, as opposed to an open fit, of the sleeve in U.S. Pat. No. 6,886,296 described, can result in moisture being held at the interface of the post and the ground and/or the post and the sleeve. Also, it can result in moisture escaping more slowly from the part of the post below the ground. The invention described in the matter of this current application enables air flow around the entire post inside the device including in the ground and at the ground and device level. This greatly enhances the protection of the post helping the whole post perform similarly from a damage point of view to the part of the post that sticks out of the ground (e.g. the post performs similarly to a post that is completely above ground).

[0004] U.S. Pat. No. 6,886,296 to John and John also claims improved the insertion and removal. However, it does not address the challenges of post placement relative to the struc-

tures (for example: fences, decks, light posts and other) the posts are integral with for new and replacement applications as this invention does. This invention, the subject of this application, allows for the placement and preparation (digging, device ready, and cement, dirt, rock, etc., backfill) of all of the holes absent the post and the structure. The advantage is similar to a custom Job shop factory (prior art) versus an assembly line (new invention), as the holes can be fully prepared absent the posts and any other part of the structure. Also, this invention allows for very easy replacement due to the margins discussed as part of the device design. Structures settle, shift, warp, and otherwise change over time preventing a perfect fit to original layout and specifications. This invention, via the margin in the device, allows a post to be replaced without significant difficulty or changes/modifications (for example: jacking up as structure, trimming or otherwise modifying it, etc.) and to result in a replaced post with the strength and rigidity of a brand new installation. The prior art, again, is similar to custom work with it costs, time, effort, and variation of result vs. an efficient and predictable assembly line like setup. Furthermore, the new invention, as opposed to the prior art, always produces a superior, sturdy, repeatable fixation of the post to the ground.

**DESCRIPTION OF DRAWINGS**

[0005] FIG. 1—This figure contains a drawing of the basic rectangular configuration of the invention with nominal dimensions, two opposing ears (attachment brackets—Dim D), and related notes providing additional definition and information related to dimensional specifications and materials used in the invention.

[0006] FIG. 2—This figure contains a drawing of a manifestation of the invention with associated dimensions which match the configuration of the invention shown in the accompanying document (5EZMZManufacturedExample-oftheInvention.pdf) which is a manufactured, tangible example of a configuration of the invention.

[0007] FIG. 3—This figure contains drawings depicting the rectangular configuration of the invention in the context of its applied environment: in the ground, generally surrounded by fill (except for the portion above the ground level), with a post inserted into the invention.

[0008] FIG. 4—This figure contains drawing and related notes depicting a rectangular configuration of the device in one of its applications as an integral part of a fence securing a rectangular fence post.

[0009] FIG. 5—This figure contains a drawing and related notes depicting a rectangular configuration of the device in one of its applications as an integral part of a fence securing a cylindrical fence post.

[0010] FIG. 6—This figure contains drawing and related notes depicting a rectangular configuration of the device in one of its applications as an integral part of a fence securing a triangular fence post.

[0011] FIG. 7—This figure contains a drawing and related notes depicting a cylindrical configuration of the device in one of its applications as an integral part of a fence securing a cylindrical fence post.

[0012] FIG. 8—This figure contains a drawing and related notes depicting a cylindrical configuration of the device in one of its applications as an integral part of a fence securing a rectangular fence post.

[0013] FIG. 9—This FIG. 15 a repeat of the materials in FIG. 8.

**[0014]** FIG. 10—This figure contains a drawing and related notes depicting a cylindrical configuration of the device in one of its applications as an integral part of a fence securing a triangular fence post.

**[0015]** FIG. 11A—This figure contains a drawing of a configuration of the invention depicting the invention with a single ear (post attachment bracket—Dim D in the drawing).

**[0016]** FIG. 11B—This figure contains a drawing of a configuration of the invention depicting the invention with two adjacent ear brackets (post attachment bracket—Dim D in the drawing) and corresponding notes describing an orientation of the ear brackets with 4 ears (one for each side of a rectangular post) and a description that the various ear orientations apply to the cylindrical post and device depictions of the invention presented in this file.

**[0017]** FIG. 12—This figure contains a drawing that matches the configuration depicted in FIG. 2 (FIG. 2, of these drawings with the exception of depicting a different variation (one of many variations) of the fixation hole patterns in the ear (post attachment bracket) portions of the invention.

1. A metal or plastic device for assembly line like ease of placement of new wood, metal, or plastic posts and the accompanying structures the posts support in a new construction. The device made of metal (for example: steel, iron, aluminum, titanium, other) or strong plastic (for example: ABS, Polycarbonate, PVC, polyurethane, polypropylene, 3-D printing plastics, other) of a thickness that maintains its rigidity and shape with dirt, rock, sand, or cement placed around it in the ground (0+ to 10+ feet deep) that fits the portion of a generally rectangular post that is below ground. The device has an open upper end, a closed lower end, and surrounding side walls with portions of the walls that go up the side of post above the ground some distance less than the length of the post above the ground (see the accompanying diagrams). The device is dimensioned such that the open upper end has dimensions for receiving the lower end of the post therein with some slightly more significant margin (0"+ to 24" nominal plus the post width—e.g. 4" square post could have a device 4" to 28" in length) of adjustment in one of the X Y axis for ease of placement and some less significant margin (0"+ to 2" nominal plus the post width) in the other X Y axis for general ease of installation and fixation. Margins greater than these in both XY dimensions are also considered within the scope of this invention, but generally less practical. The margin in the X Y axis (z being into the ground) enables allowance for ease of creation of the ready to install pre-fabricated post holes. The holes can be dug, the device put into place in the hole and back filled with cement, dirt, rock, sand or other material. The margin in the device XY dimensions provides allowance for positioning the post that makes the pre-fabrication of the holes easier and faster while allowing for a final structure that is easier to put together in a more precise manner. To enable positioning of a structure, the portion of the side walls that extend up the post above the ground can be on one or two opposing sides when placing a fence, allowing the fence panel to fit within the device portion extending above the ground thus enabling repositioning of the structure. The portion extending above the ground can also be one to four sides for a supporting post applications (e.g. deck posts, pilings, other). Once in position the portion of the side wall that extends up the side of the post above the ground has an array (1 to many depending on the X Y dimensions) of holes for fastening the post to the device with bolts or screws creating excellent rigidity, strength, and stability.

2. A device that enables ease of in-ground post replacement with like new fit, strength and stability. A metal or plastic device for easy replacement of a damaged or broken wood, plastic, or metal posts. The device is made of metal (for example: steel, iron, aluminum, titanium, other) or strong plastic (for example: ABS, Polycarbonate, PVC, polyurethane, polypropylene, 3-D printing plastics, other) of a thickness that maintains its rigidity and shape with dirt, rock, sand, or cement placed around it in the ground (0+ to 10+ feet deep) that fits the portion of a generally rectangular post that is below ground. The device has an open upper end, a closed lower end, and surrounding side walls with portions of the walls that go up the side of post above the ground some distance less than the length of the post above the ground (see the accompanying diagrams). The device is dimensioned such that the open upper end has dimensions for receiving the lower end of the post therein with some slightly more significant margin (0"+ to 24" nominal plus the post width—e.g. a 4" post could have a device 4" to 28" in length) of adjustment in one of the X Y axis and some less significant margin in the other X Y axis (0"+ to 2" nominal plus the post width). Margins greater than these are also considered within the scope of this invention, but are generally less practical. The margin in the X Y axis (z being into the ground) enables allowance for ease of removal and more importantly ease of replacement and repositioning of the new post. This margin is significant in being able to fit the post back into its correct position within the existing structure that it supports such as between fence panels, under a deck, other. The invention allows for ease of post replacement to structures which have changed over time (e.g. settling, warping, etc.)—something that conventional post placement and current art does not allow for (e.g. no allowance for repositioning, or forced to reset post in new hole). To enable repositioning of a structure, the portion of the side walls that extend up the post above the ground can be on one or two opposing sides when placing a fence allowing the fence panel to fit within the device portion extending above the ground. This enables and facilitates repositioning of the structure. The device can also have one to four sides that extend up the post above the ground for a supporting post application (e.g. a deck post, piling, etc.). Once in position the portion of the side wall that extends up the side of the post above the ground has an array (1 to many depending on the device dimensions) of holes for fastening the post to the device with bolts or screws creating excellent rigidity and stability (as if the post were newly set in the hole).

3. A metal or plastic device that provides novel protection for the lower end of wood, metal, or plastic posts from damage due to moisture induced rot, deformation, and/or oxidation while the post is positioned within a hole in the ground. The device is made of metal (for example: steel, iron, aluminum, titanium, other) or strong plastic (for example: ABS, Polycarbonate, PVC, polyurethane, polypropylene, 3-D printing plastics, other) of a thickness that maintains its rigidity and shape with dirt, rock, sand, or cement placed around it in the ground (0+ to 10+ feet deep). The device fits the portion of a generally rectangular post that is below ground. The device has an open upper end, a closed lower end, and surrounding side walls with portions of the walls that go up the side of post above the ground some distance less than the length of the post above the ground (see the accompanying diagrams previously mentioned). The open upper end is dimensioned for receiving the lower end of the post therein with some slightly more significant margin (0"+ to 24" nomi-

nal plus the post width—example: post is 4" wide, device could be 4"+24" or 28") of adjustment in one of the XY axis (z being into the ground) and some less significant margin in the other X Y axis (0+ to 2" nominal plus the post width). Margins greater than these are also considered within the scope of this invention, but generally less practical. The XY margin provides protection for the post by generally providing a space of air around the post enabling the post to remain dry (with similar environmental exposure to the above ground portion of the post). This is superior to other protective post inventions which do not allow the significant air space, especially at ground level where most posts degrade and fail. The design and material of the device is such that an air barrier around the post can be achieved while still enabling the post to be rigidly positioned and fastened into the ground (with a strength as if there were no air space). The bottom of the device has an array (1 to many depending on the device dimensions) of holes for drainage to further protect the bottom of the post.

4. A derivative claim of claims 1-3 in which the metal or plastic device achieves those claims and has the same general dimensions of the device relative to the post described in those claims with the device having a rectangular, cylindrical, or triangular shape and used in application with any combination of a wood, metal, or plastic post having a rectangular, cylindrical, or triangular shape. The part of the side wall of the device that extends above the ground up the post in the rectangular device is as claimed in claims 1-3. The device with the cylindrical configuration can extend above the ground with a full cylindrical configuration or a semi-cylindrical configuration allowing for a structure to pass through the portion of the device sidewall above the ground directly to the post. The device with a triangular configuration can extend above the ground with only one sidewall above the ground or all 3 sidewalls above the ground.

5. A derivative claim of the device in claims 1-3 of a metal or plastic (rectangular, cylindrical, or triangular) device as

described here to be placed in a hole in the ground that is backfilled with cement, dirt, sand, or rock around the device with the device having adequate strength and rigidity to prevent deformation from the backfill where such device will be used to easily receive and fasten a wood, plastic, or metal (rectangular, cylindrical, or triangular) post providing comparable strength, rigidity, and stability to the post as if it were directly in cement or otherwise buried in the ground.

6. A derivative claim of claims 1-3 where the metal or plastic device with side walls that are at or extend above the ground the desired height has an array (1 to many depending on the device dimensions) of holes in those portions of the sidewalls at or above the ground level for bolts or screws that results in excellent rigidity, strength, and stability of the inserted post.

7. A derivative claim of claim 3 above, in which the metal or plastic device structure presented in this invention with portions of the sidewall that extend up the post some distance above the ground protect that part of the post above ground from damage due to lawn equipment and lawn care.

8. A derivative of claim 3 above, in which the metal or plastic device structure presented in this invention with the bottom portion of the device in the hole has a slat orientation (long rows of cut outs) rather than holes for drainage to prevent lack of drainage associated with plugged holes (holes are more likely to plug).

9. A derivative claim of claims 1-3, in which the metal or plastic device presented in this invention is configured such that the outside of the part of the device in the ground is roughened or shaped with patterns that cause the surface to have greater surface area for improved adhesion/hold of the device to the cement, earth, rock, sand, other placed against it at the time of the hole preparation and backfill around the device.

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