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(54) **SUPPORT STAKE AND METHOD OF USE**

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(76) **Inventor: Thomas B. Milne, Salt Lake City, UT (US)**

(57) **ABSTRACT**

Correspondence Address:
Steve M. Perry
THORPE, NORTH & WESTERN, L.L.P.
P.O. Box 1219
Sandy, UT 84091-1219 (US)

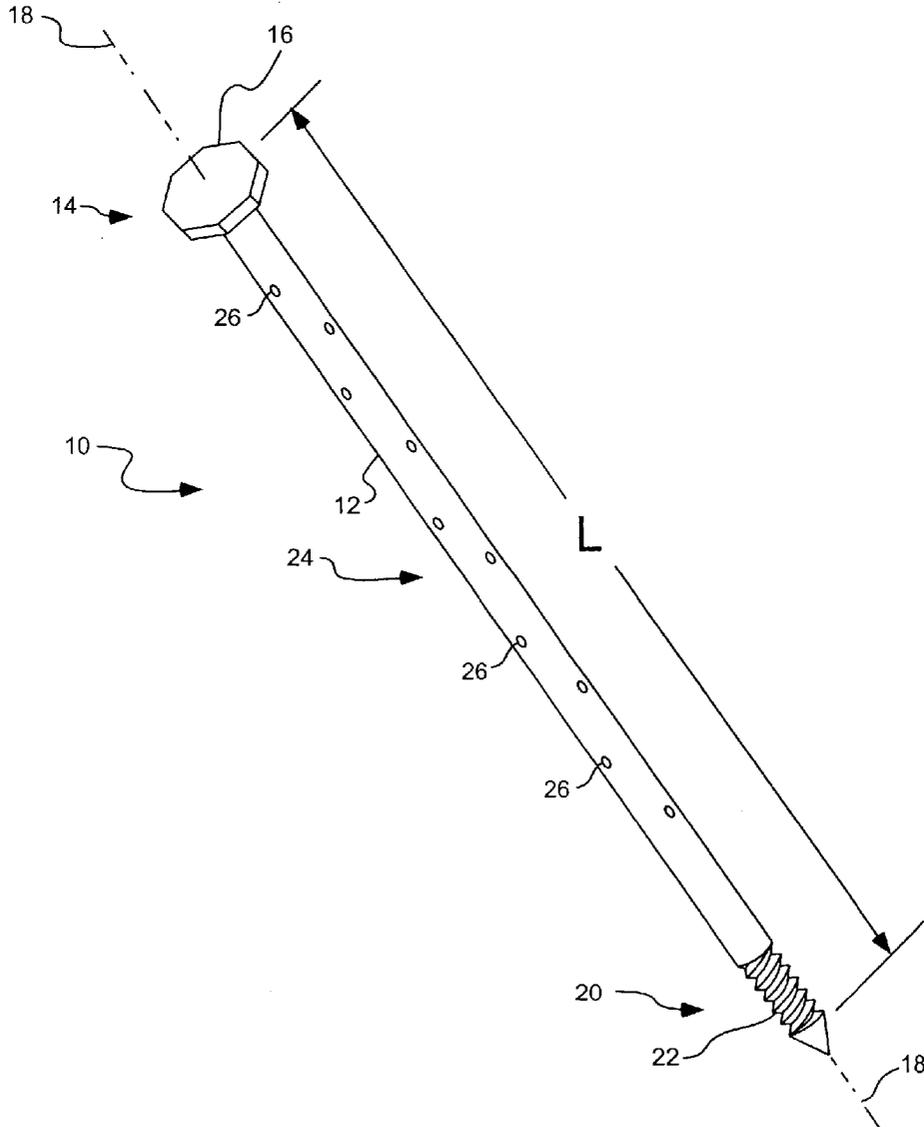
A stake device for providing support to a structure, including an upper end that includes interface means for transferring torsional force to the support stake to enable an operator to rotate the support stake about a longitudinal axis of the support stake. The stake includes a lower end that includes thread means for threadably engaging ground to allow the support stake to be threaded downwardly into the ground. An elongate intermediate section is disposed between the upper end and lower end and includes at least one opening formed within the intermediate section, said opening running substantially orthogonally to the longitudinal axis of the support stake and being configured to receive a securing device to secure the support device to the structure.

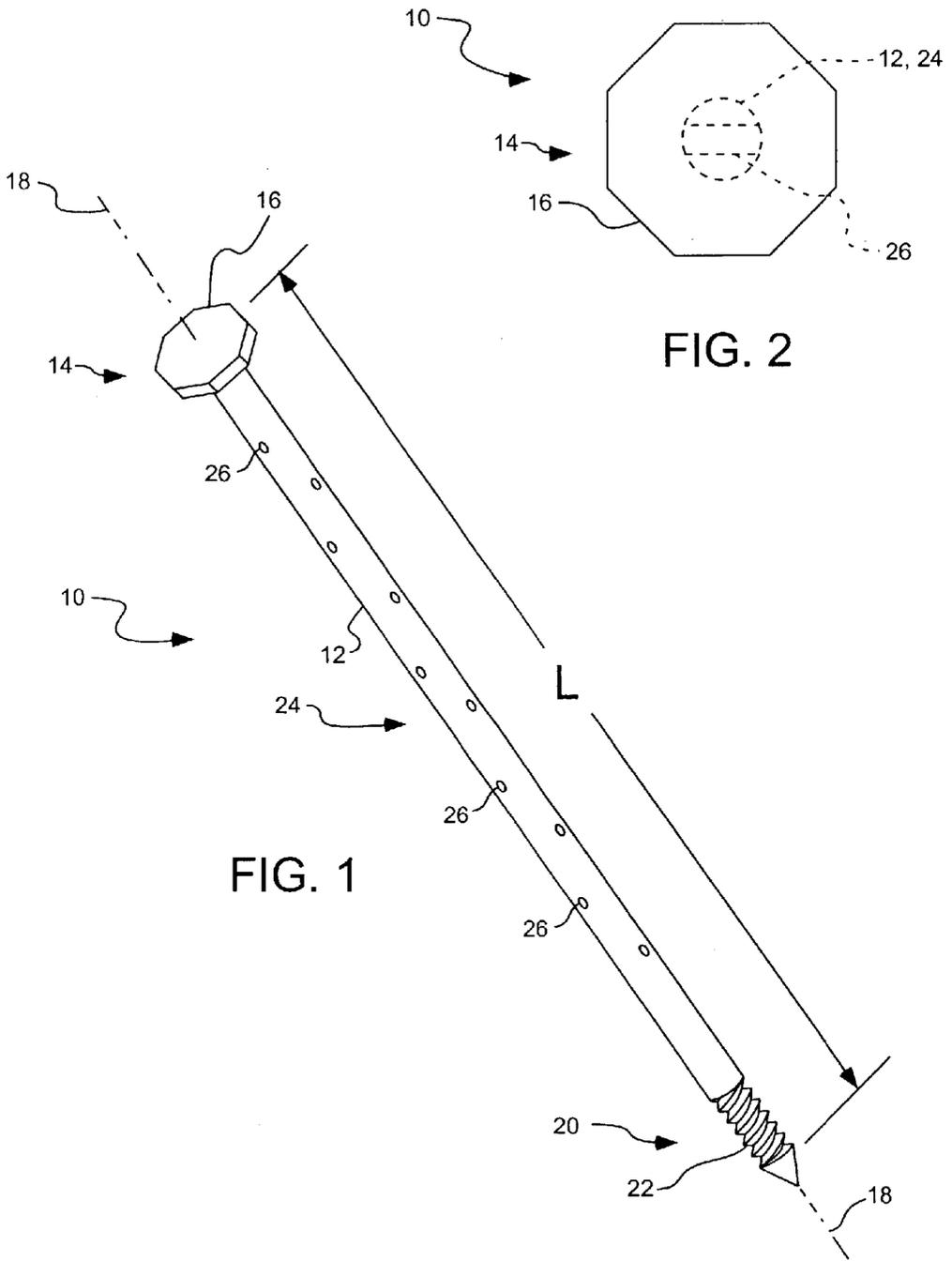
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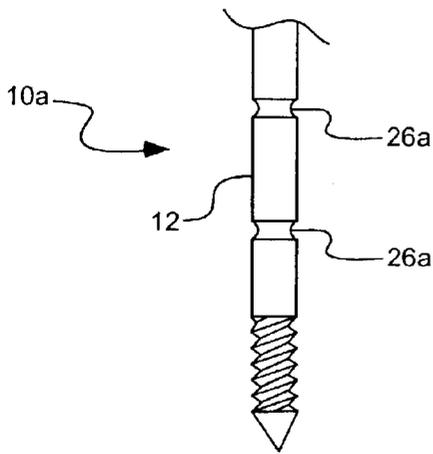


FIG. 3a

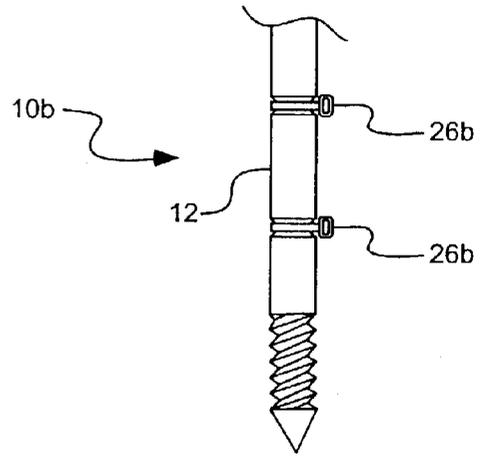


FIG. 3b

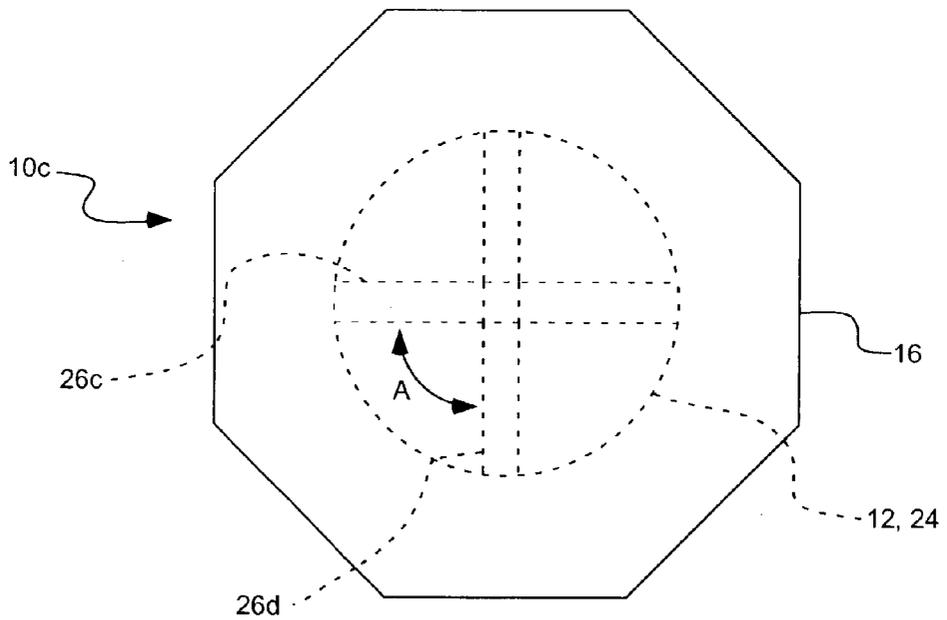


FIG. 4

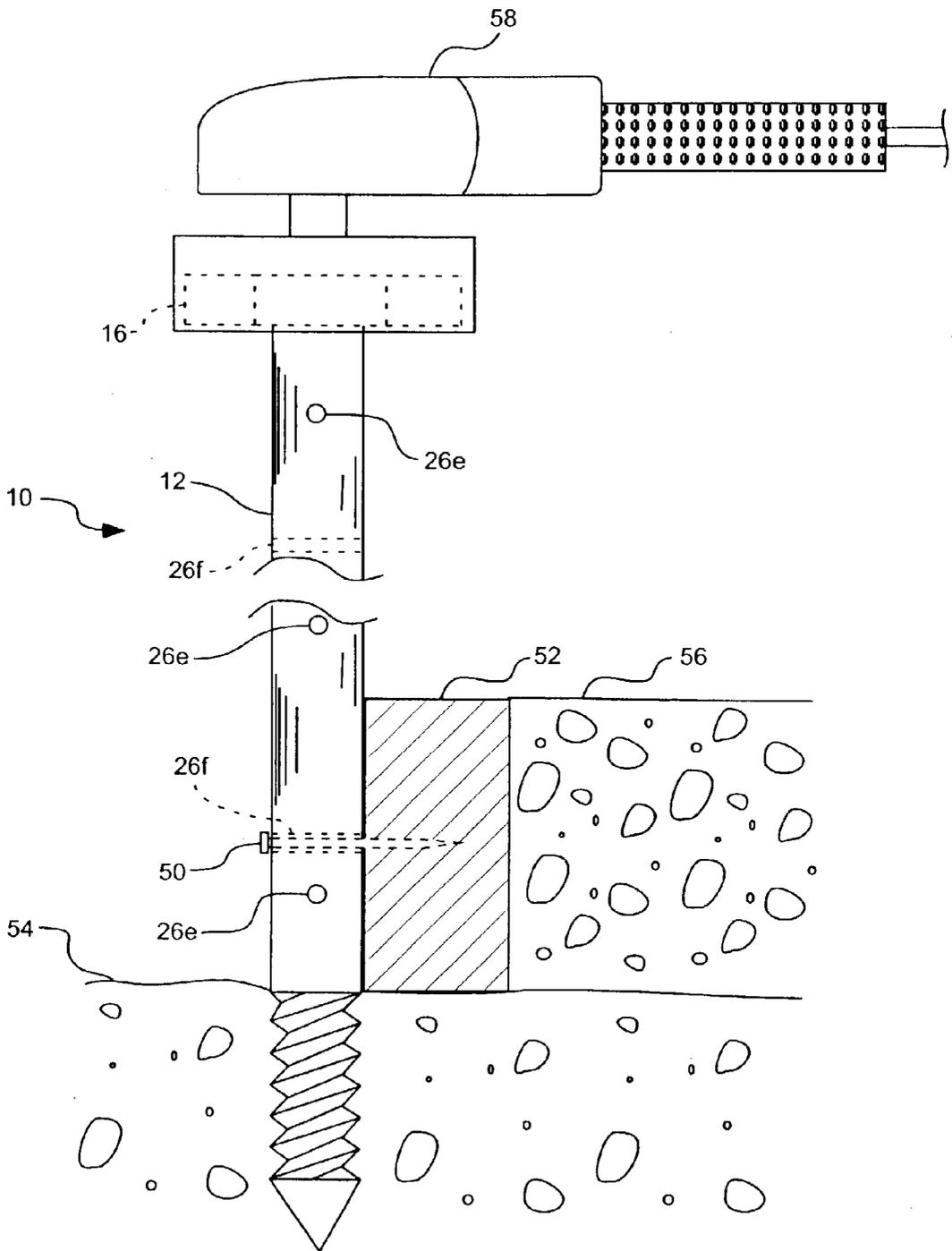


FIG. 5

SUPPORT STAKE AND METHOD OF USE

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates generally to a support stake for use in providing support to a structure.

[0003] 2. Related Art

[0004] In the construction industry it is often necessary to insert a stake into the ground to provide support for one structure or another. One such case often arises when forming a concrete slab, curbing or gutter. Since concrete is generally poured in an uncured, liquid state, the wet concrete is poured into an area defined by a form which retains the concrete until the concrete has cured. Forms made of wood or metal which define an area where the concrete is to be placed are often constructed on top of the ground or earth. Typically, the forms are constructed on bare earth by driving a metal support stake into the ground with a sledge hammer. The wooden or metal forms are then secured to the support stake in order to prevent the forms from moving or being deformed when filled by the heavy, wet cement.

[0005] The supports stakes used for this procedure are typically pounded downwardly into the ground. This process can be troublesome in that rocks or other obstructions often exist in the ground that sometimes prevent the support stakes from entering or piercing the ground. Thus, a support stake is often pounded partially into the ground only to have to be removed after an obstruction is contacted. The force ordinarily applied to the top of the support stake often causes the support stake to deform or become bent after use, which limits the useful life of many conventional support stakes. This wear is often exacerbated by the occasions when the support stake contacts an obstruction, which can result in deformation of the support stake even when in a relatively new state.

[0006] Even when support stakes are successfully pounded into the ground without deformation occurring, removal of most support stakes often causes deformation of the stake. For instance, most support stakes are removed by striking the stake on one side and then another to compact the earth around the support stake to increase the size of the hole the stake created when pounded into the ground. By enlarging this hole, the lateral, frictional force imparted by the ground is reduced, and the stake can be more easily pulled from the ground. However, the lateral strike forces applied to the stake increase the time it takes to remove the stake and also necessarily lead to increased deformation or bending of the stake, and thus shorter life of the stake.

[0007] In addition, much time and labor is involved in pounding each stake into the ground prior to pouring cement, then removing each stake from the ground after the concrete has cured. To accomplish the task of constructing long segments of forms, such as are required when long stretches of sidewalk or curbing are poured, a team of four to six workers is often used to install and remove the numerous stakes required in a timely manner. Such an outlay of manpower is both administratively complex and expensive.

SUMMARY OF THE INVENTION

[0008] It has been recognized that it would be advantageous to develop a support stake that is capable of being

driven into the ground without requiring the stake be pounded into the ground to install the stake and without requiring that the stake be pounded from side to side to remove the stake.

[0009] The present invention provides a stake device for providing support to a structure, including an upper end that includes interface means for transferring torsional force to the support stake to enable an operator to rotate the support stake about a longitudinal axis of the support stake, a lower end that includes thread means for threadably engaging ground to allow the support stake to be threaded downwardly into the ground, and an elongate intermediate section disposed between the upper end and lower end that includes at least one opening formed within the intermediate section, said opening running substantially orthogonally to the longitudinal axis of the support stake and being configured to receive a securing device to secure the support device to the structure.

[0010] In accordance with a more detailed aspect of the present invention, the elongate intermediate section includes a substantially circular cross sectional area.

[0011] In accordance with a more detailed aspect of the present invention, the device includes a plurality of openings, each comprising a channel formed in the intermediate section, the channels being spaced along the longitudinal axis of the stake and each channel being oriented at an angle from an immediately adjacent channel.

[0012] In accordance with a more detailed aspect of the present invention, the angle is selected from the group consisting of 15°, 30°, 45°, 60°, 75° and 90°.

[0013] In accordance with a more detailed aspect of the present invention, a total length of the device is at least 12 inches long.

[0014] In accordance with another aspect of the present invention, a method of securing a concrete form for receiving uncured concrete is provided and includes the steps of a) placing a threaded support stake on ground adjacent a location of the concrete form; b) threadably engaging the threaded support stake into the ground by applying a torsional force to the support stake; and c) securing the support stake to the concrete form by securing a fastener to the support stake and the concrete form.

[0015] In accordance with a more detailed aspect of the present invention, the support is threadably engaged into the ground by applying the torsional force to the support stake with a power tool.

[0016] In accordance with a more detailed aspect of the present invention, the method includes the further step of threadably removing the support stake by applying a torsional force in an opposite rotational direction as that used to engage the support stake into the ground.

[0017] In accordance with a more detailed aspect of the present invention, the step of securing the stake to the form comprises the step of nailing a nail through the stake into the form.

[0018] In accordance with a more detailed aspect of the present invention, a method of forming a reservoir for receiving uncured concrete is provided and includes the steps of: a) installing a support stake into ground by engag-

ing the support stake with a tool and applying a torsional force to the support stake; b) creating at least one wall of the reservoir by placing a form piece adjacent the support stake on an outward side of the form piece; c) securing the form piece to the support stake by fastening a fastener to the support stake and the form piece; and d) removing the support stake after the concrete has at least partially cured by engaging the support stake with the tool and applying a torsional force to the support stake.

[0019] In accordance with a more detailed aspect of the present invention, the support is threadably engaged into the ground by applying the torsional force to the support stake with a power tool.

[0020] In accordance with a more detailed aspect of the present invention, the power tool is selected from the group consisting of a pneumatic wrench, an electric wrench, a pneumatic drill, and an electric drill.

[0021] In accordance with a more detailed aspect of the present invention, the method further includes step of threadably removing the support stake by applying a torsional force in an opposite rotational direction as that used to engage the support stake into the ground.

[0022] In accordance with a more detailed aspect of the present invention, the step of securing the form piece to the stake comprises the step of nailing a nail through the stake into the form.

[0023] In accordance with a more detailed aspect of the present invention, a stake for providing support to a structure is provided, including an upper end including an engagement portion sized and shaped to be received by a tool to torsionally engage the stake; an intermediate section disposed adjacent the upper end, including at least one opening formed therein and configured to be engaged by a fastener to facilitate fastening of the stake to the structure; and a lower threaded section including a series of threads associated with the stake, wherein the stake is configured to be threaded into ground adjacent the structure by the tool and to be fastened to the structure to limit movement of the structure relative to the stake.

[0024] In accordance with a more detailed aspect of the present invention, the elongate intermediate section includes a substantially circular cross sectional area.

[0025] In accordance with a more detailed aspect of the present invention, the device further includes a plurality of openings, each comprising a channel formed in the intermediate section, the channels being spaced along the longitudinal axis of the stake and each channel being oriented at an angle from an immediately adjacent channel.

[0026] In accordance with a more detailed aspect of the present invention, the angle is selected from the group consisting of 15°, 30°, 45°, 60°, 75° and 90°. In accordance with a more detailed aspect of the present invention, a total length of the device is at least 12 inches long.

[0027] Additional features and advantages of the invention will be apparent from the detailed description which follows, taken in conjunction with the accompanying drawings, which together illustrate, by way of example, features of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] FIG. 1 is a perspective view of a support stake in accordance with an embodiment of the present invention;

[0029] FIG. 2 is a top, end view of the support stake illustrated in FIG. 1;

[0030] FIG. 3a is a side view of one embodiment of the support stake shown in FIG. 1;

[0031] FIG. 3b is a side view of another embodiment of the support stake shown in FIG. 1;

[0032] FIG. 4 is another top, end view of the support stake illustrated in FIG. 1; and

[0033] FIG. 5 is a side view of the support stake shown in FIG. 1 as used in connection with supporting a concrete form.

DETAILED DESCRIPTION

[0034] Reference will now be made to the exemplary embodiments illustrated in the drawings, and specific language will be used herein to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended. Alterations and further modifications of the inventive features illustrated herein, and additional applications of the principles of the inventions as illustrated herein, which would occur to one skilled in the relevant art and having possession of this disclosure, are to be considered within the scope of the invention.

[0035] As illustrated in FIG. 1, a system, indicated generally at 10, in accordance with the present invention is shown for a stake device for providing support to a structure. The stake 12 includes an upper end 14 which includes interface means or engagement section 16 for transferring torsional force to the support stake. The interface means enables an operator to rotate the support stake 12 about a longitudinal axis 18 of the support stake to facilitate threading of the stake into the ground or earth.

[0036] The interface means or engagement section can be configured in a variety of ways. For instance, the engagement section can be an octagon shaped section similar to a head of a conventional bolt. Of course, a hexagon shape can also be used, as can any shape or structure known to those skilled in the art for providing an interface between a stake and a tool, such as a slotted interface similar to a screw and screwdriver arrangement. The present invention can thus be used to rotationally drive a stake into the ground instead of pounding stakes into the ground, as is required with conventional stakes. As one example of a use of the stake, an electric or pneumatic drill or impact wrench can be fitted with a socket and the socket can be placed on a hexagonal head of the support stake. The drill or wrench can then be used to thread the support stake into the ground.

[0037] The stake includes a lower end 20 which can include thread means or threaded section 22 for threadably engaging ground to allow the support stake to be threaded downwardly into the ground. The thread means or threaded section can be of any type known to those skilled in the art, and can be formed below an outer surface of the stake or raised above the outer surface. In one embodiment of the present invention, the threads are formed at 2.5 threads per inch and are approximately $\frac{3}{16}$ " to $\frac{5}{16}$ " deep. The invention thus provides a support stake that is easy to install and equally easy to remove.

[0038] An elongate intermediate section 24 can be included on the stake and can include at least one opening

26 formed within the intermediate section. The openings **26** can be formed in the intermediate section such that they run substantially orthogonally to the longitudinal axis **18** of the support stake. That is, when the stake is in a substantially vertical orientation, the openings will lie in a substantially horizontal orientation. The openings are configured to receive a securing device (shown at **50** in **FIG. 5**) to secure the support device to the structure.

[0039] The present invention can be utilized in any operation that can benefit from the presence of a support stake driven into the ground. One such operation is forming curb or sidewalk forms, wherein traditionally four to six workers may be dispatched to install and uninstall the many stakes required to support the forms. Using the present support stake, one or two workers can be equipped with power tools and can install and uninstall the many stakes required in the same amount of time it previously took four to six workers, using conventional stakes and sledgehammers. While much of the present discussion will focus on the support stake as used to provide support to a concrete form, the present invention is not so limited. For instance, the support stake can be advantageously used to form string-line systems, used as survey stakes, or used to support landscape timbers. These applications, as well as many more, can benefit from a support stake that can be quickly and easily threaded into ground and can also be quickly and easily threadably removed from the ground.

[0040] As shown at **24** in **FIG. 2**, the elongate intermediate section can include a substantially circular cross sectional area. While any cross sectional shape can be used for the intermediate section, a substantially circular cross sectional shape will allow the support stake to be inexpensively formed and provides the further benefit that the outer surface of the stake can be flatly engaged by or against another structure without having to align the stake in any particular rotational alignment. The openings **26** can each comprise a channel formed in the intermediate section **24** and can be spaced along the longitudinal axis **18** of the stake **12**. As shown by **L** in **FIG. 1**, a total length of the device can be at least 12 inches long, long enough to firmly engage the ground and yet still provide an area in which securing devices or fasteners are secured to the stake. In one embodiment, the total length of the stake is between 12 inches and 48 inches, with the threaded section being 8 inches to 10 inches in length.

[0041] As shown in perspective view in **FIG. 1** and in detail in **FIG. 4**, each channel can also be oriented at an angle **A** from an immediately adjacent channel. For instance, the channels **26c** and **26d** are formed at angle **A** relative to each other. By spacing the openings along the longitudinal axis **18** of the stake, and by forming the openings at alternating angle **A**, a series of openings can be easily aligned with a structure to which the stake is to be secured. For instance, the angle can be selected from the group consisting of 15°, 30°, 45°, 60°, 75° and 90°. Thus, if multiple openings are aligned at 30° from each other, when an operator is rotationally driving the stake into the ground, he or she need rotate the stake only 30° one direction or another in order to align a set of openings such that a securing device can be driven through an opening and into the structure.

[0042] This concept is illustrated by the embodiment shown in **FIG. 5**. Here, the securing device **50**, which can be

a nail, for example, is oriented through the stake **12** in one of openings **26f** into a structure **52**. The series of openings **26e** are shown as aligned parallel to the structure **52**, whereas the series of openings **26f** are formed at a perpendicular angle to the alignment of the structure. Thus, in the embodiment shown, the openings **26e** and **26f** are formed at an angle of 90°. Consequently, an operator, while rotationally driving the stake **12** into the ground **54**, would rotate the stake 90° one way or the other to align one set of openings with the structure to enable securing devices to be driven through the stake and into the structure.

[0043] The openings **26** in the stake **12** are not limited to channels or holes formed in the stake. For instance, the opening can comprise alternate shapes such as rectangular notches, and can be formed internally or on an outside of the stake. Alternate embodiments of the openings are shown in **FIGS. 3a** and **3b**, at **26a** and **26b**, respectively. The opening **26a** in **FIG. 3a** is a groove formed around an outer circumference of the stake. The opening **26a** can thus be engaged by a U-shaped nail or other fastener as the fastener is driven into a support structure. This type of opening is advantageous in that the stake **12** need not be precisely aligned in any rotational orientation in order for the fastener to engage the opening in the stake.

[0044] The opening **26b** shown in **FIG. 3b** is a loop formed in a ring that can rotationally engage the stake **12**. This type of opening is similarly advantageous in that the stake **12** need not be precisely aligned in any orientation, but can be engaged by a fastener in any rotational orientation. Thus, once the stake **12** is rotationally driven into the ground, the opening **26b** can be turned around the stake until properly aligned, and a fastener can be driven through the opening and into a structure.

[0045] The present invention also provides a method of securing a concrete form for receiving uncured concrete, illustrated in **FIG. 5**. Here, a support stake **12** can be placed on ground **54** adjacent a location of the form **52**. The support stake can then be threadably engaged into the ground by applying a torsional force to the support stake at interface means or engagement section **16**. Once engaged into the ground, the support stake can be secured to the concrete form **52** by securing a fastener **50** to the support stake and the form. The fastener or securing device can be any known to those skilled in the art, such as a nail, screw or bolt, and can either be in a straight configuration, a U-shaped configuration, or any shape known to those in the art. Once the form and stake are in place, uncured concrete **56** can then be placed on the opposing side of the form **52**, and the form **52** will be held in place by the stake **12**.

[0046] The support stake **12** can be rotationally driven into the ground by using a power tool **58** to apply the torsional force to the stake. Such power tools may, for instance, be a pneumatic wrench, an electric wrench, a pneumatic drill, or an electric drill, as are known to those skilled in the art. Of course, a hand driven tool such as a socket attached to a ratchet may also be used. Thus, to install the support stake into the ground, a user can simply place the stake in a desired location, engage the support stake with a tool, and quickly drive the support stake into the ground. Should an obstacle in the ground be encountered, the stake can be quickly rotated out of the ground, moved to a new location, and driven into the ground again. After the concrete has at least

partially cured, the fastener **50** can be removed from the stake and form, and the stake can be threadably removed by applying a torsional force in an opposite rotational direction as that used to engage the support stake into the ground.

[0047] The present invention thus provides a support stake that can be easily driven and removed from ground or earth. If an obstacle is encountered while driving the stake into the ground, an operator can quickly and easily reverse direction of the tool used to install the stake, quickly remove the stake, move it to a new location, and reinstall the stake. The threaded section of the stake can allow an operator to accurately and easily adjust the depth of insertion into ground, and thus the height the stake protrudes above the ground. In addition to providing a support stake that is faster and simpler to install, the present invention can substantially increase the life of the support stake, as the support stake will not become deformed or bent, as previous stakes were due to pounding the stakes into and out of the ground.

[0048] It is to be understood that the above-referenced arrangements are illustrative of the application for the principles of the present invention. Numerous modifications and alternative arrangements can be devised without departing from the spirit and scope of the present invention while the present invention has been shown in the drawings and described above in connection with the exemplary embodiments(s) of the invention. It will be apparent to those of ordinary skill in the art that numerous modifications can be made without departing from the principles and concepts of the invention as set forth in the claims.

What is claimed is:

1. A stake device for providing support to a structure, comprising:

- a) an upper end, including interface means for transferring torsional force to the support stake to enable an operator to rotate the support stake about a longitudinal axis of the support stake;
- b) a lower end, including thread means for threadably engaging ground to allow the support stake to be threaded downwardly into the ground; and
- c) an elongate intermediate section disposed between the upper end and lower end, including at least one opening formed within the intermediate section, said opening running substantially orthogonally to the longitudinal axis of the support stake and being configured to receive a securing device to secure the support device to the structure.

2. A device in accordance with claim 1, wherein the elongate intermediate section includes a substantially circular cross sectional area.

3. A device in accordance with claim 1, further comprising a plurality of openings, each comprising a channel formed in the intermediate section, the channels being spaced along the longitudinal axis of the stake and each channel being oriented at an angle from an immediately adjacent channel.

4. A device as in claim 3, wherein the angle is selected from the group consisting of 15°, 30°, 45°, 60°, 75° and 90°.

5. A device in accordance with claim 1, wherein a total length of the device is at least 12 inches long.

6. A method of securing a concrete form for receiving uncured concrete, comprising the steps of:

- a) placing a threaded support stake on ground adjacent a location of the concrete form;
- b) threadably engaging the threaded support stake into the ground by applying a torsional force to the support stake; and
- c) securing the support stake to the concrete form by securing a fastener to the support stake and the concrete form.

7. A method in accordance with claim 6, wherein the support is threadably engaged into the ground by applying the torsional force to the support stake with a power tool.

8. A method in accordance with claim 6, further comprising the step of threadably removing the support stake by applying a torsional force in an opposite rotational direction as that used to engage the support stake into the ground.

9. A method in accordance with claim 6, wherein the step of securing the stake to the form comprises the step of nailing a nail through the stake into the form.

10. A method of forming a reservoir for receiving uncured concrete, comprising the steps of:

- a) installing a support stake into ground by engaging the support stake with a tool and applying a torsional force to the support stake;
- b) creating at least one wall of the reservoir by placing a form piece adjacent the support stake on an outward side of the form piece;
- c) securing the form piece to the support stake by fastening a fastener to the support stake and the form piece; and
- d) removing the support stake after the concrete has at least partially cured by engaging the support stake with the tool and applying a torsional force to the support stake.

11. A method in accordance with claim 10, wherein the support is threadably engaged into the ground by applying the torsional force to the support stake with a power tool.

12. A method in accordance with claim 10, wherein the power tool is selected from the group consisting of a pneumatic wrench, an electric wrench, a pneumatic drill, and an electric drill.

13. A method in accordance with claim 10, further comprising the step of threadably removing the support stake by applying a torsional force in an opposite rotational direction as that used to engage the support stake into the ground.

14. A method in accordance with claim 10, wherein the step of securing the form piece to the stake comprises the step of nailing a nail through the stake into the form.

15. A stake for providing support to a structure, comprising:

- a) an upper end including an engagement portion sized and shaped to be received by a tool to torsionally engage the stake;
- b) an intermediate section disposed adjacent the upper end, including at least one opening formed therein and configured to be engaged by a fastener to facilitate fastening of the stake to the structure; and

c) a lower threaded section including a series of threads associated with the stake, wherein the stake is configured to be threaded into ground adjacent the structure by the tool and to be fastened to the structure to limit movement of the structure relative to the stake.

16. A device in accordance with claim 15, wherein the elongate intermediate section includes a substantially circular cross sectional area.

17. A device in accordance with claim 15, further comprising a plurality of openings, each comprising a channel

formed in the intermediate section, the channels being spaced along the longitudinal axis of the stake and each channel being oriented at an angle from an immediately adjacent channel.

18. A device as in claim 17, wherein the angle is selected from the group consisting of 15°, 30°, 45°, 60°, 75° and 90°.

19. A device in accordance with claim 15, wherein a total length of the device is at least 12 inches long.

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