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McMichael et al.

[11] **3,837,127**

[45] **Sept. 24, 1974**

[54] **MOBILE HOME LEVELING AND HOLD-DOWN SUPPORT**

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[52] **U.S. Cl.** ..... **52/126**, 52/23, 248/354 S

[51] **Int. Cl.** **A45f 3/44**, E04g 25/06

[58] **Field of Search** ..... 52/126, 588, 378, 379, 52/505, 576, 577, 3–5, 23, 148; 248/352, 354 S

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Assistant Examiner—Leslie A. Braun
Attorney, Agent, or Firm—Michael Williams

[57] **ABSTRACT**

This invention consists of a multi-sectioned, pre-cast support for mobile homes and similar structures, incorporating leveling and hold-down devices to facilitate and improve the finished installation.

3 Claims, 10 Drawing Figures

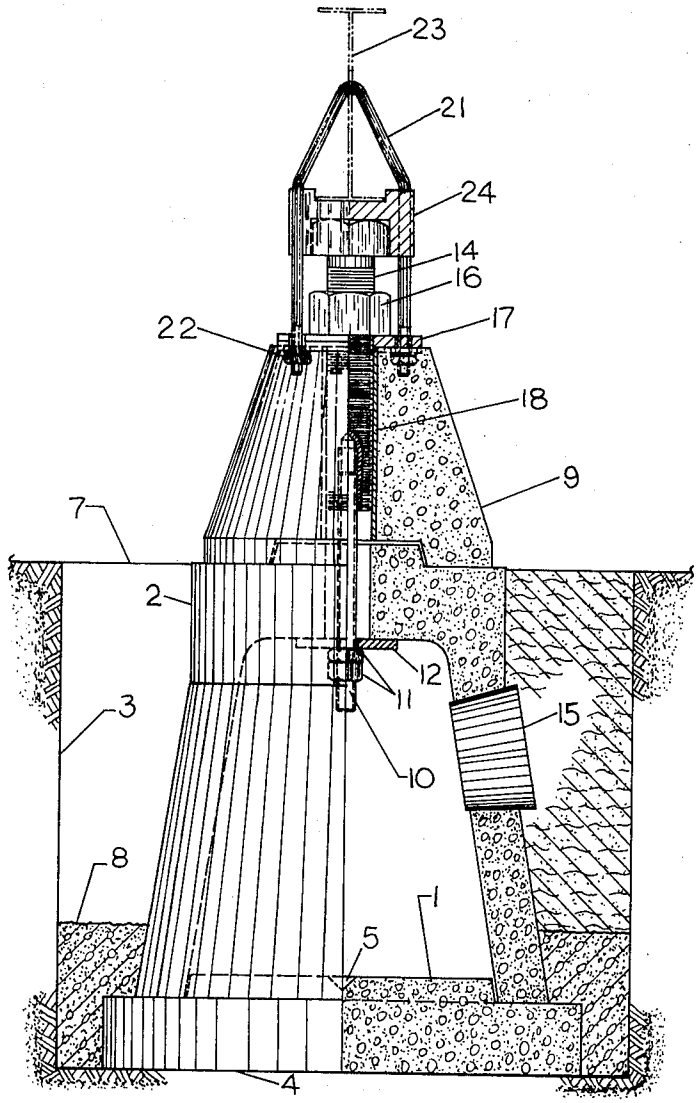


FIG. 1

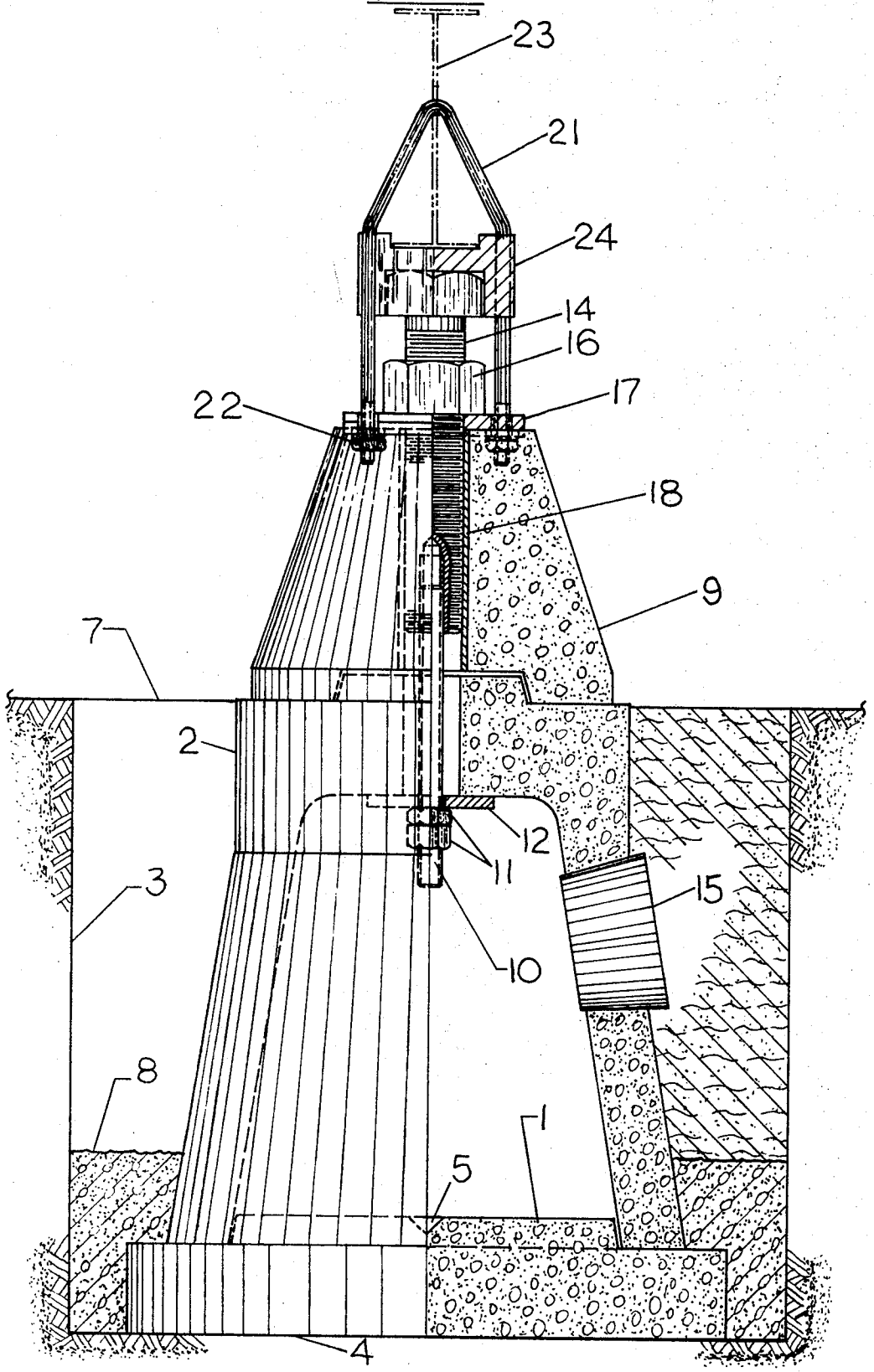


FIG. 2

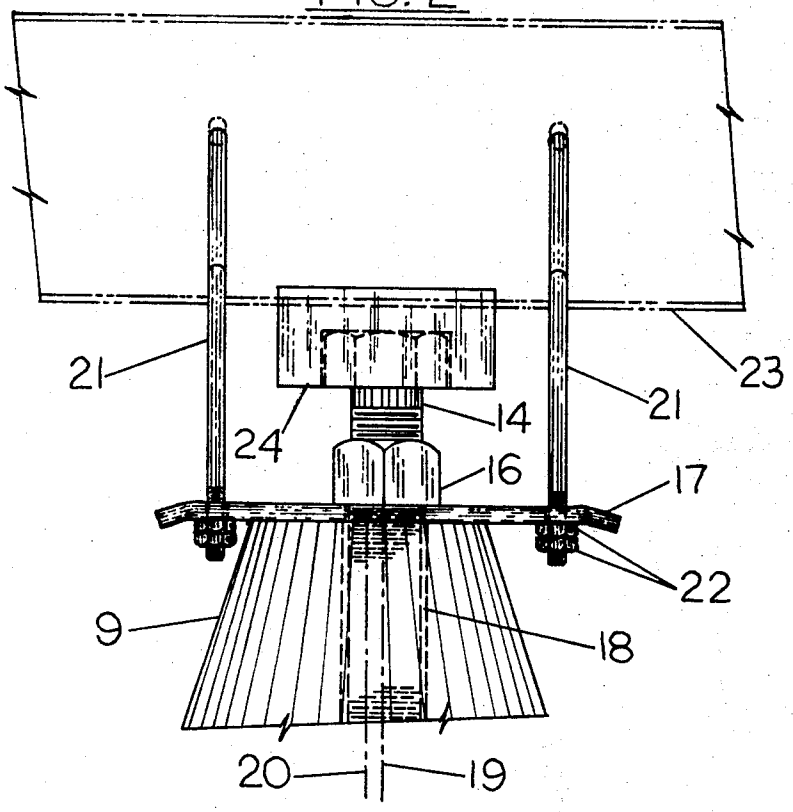


FIG. 3

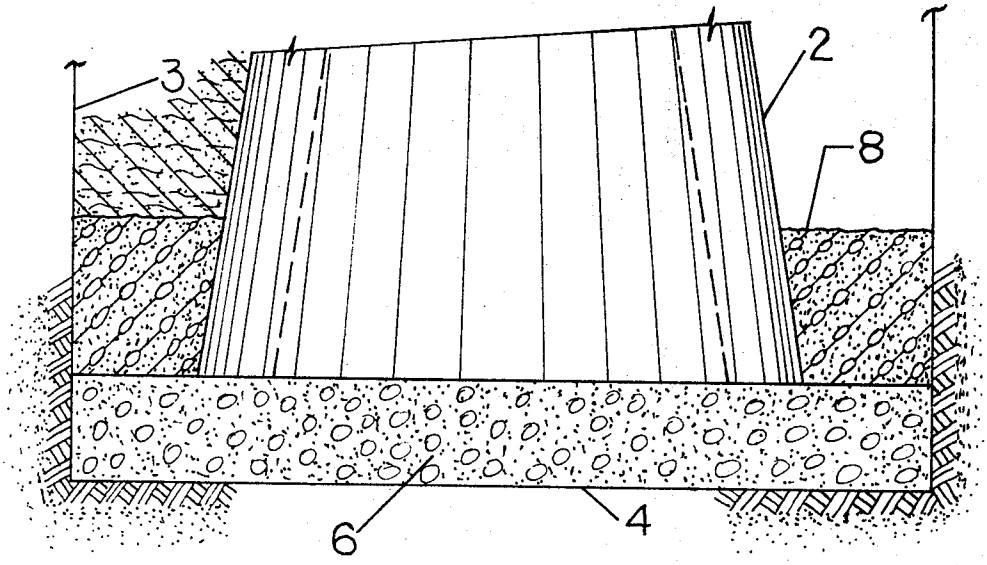


FIG. 4

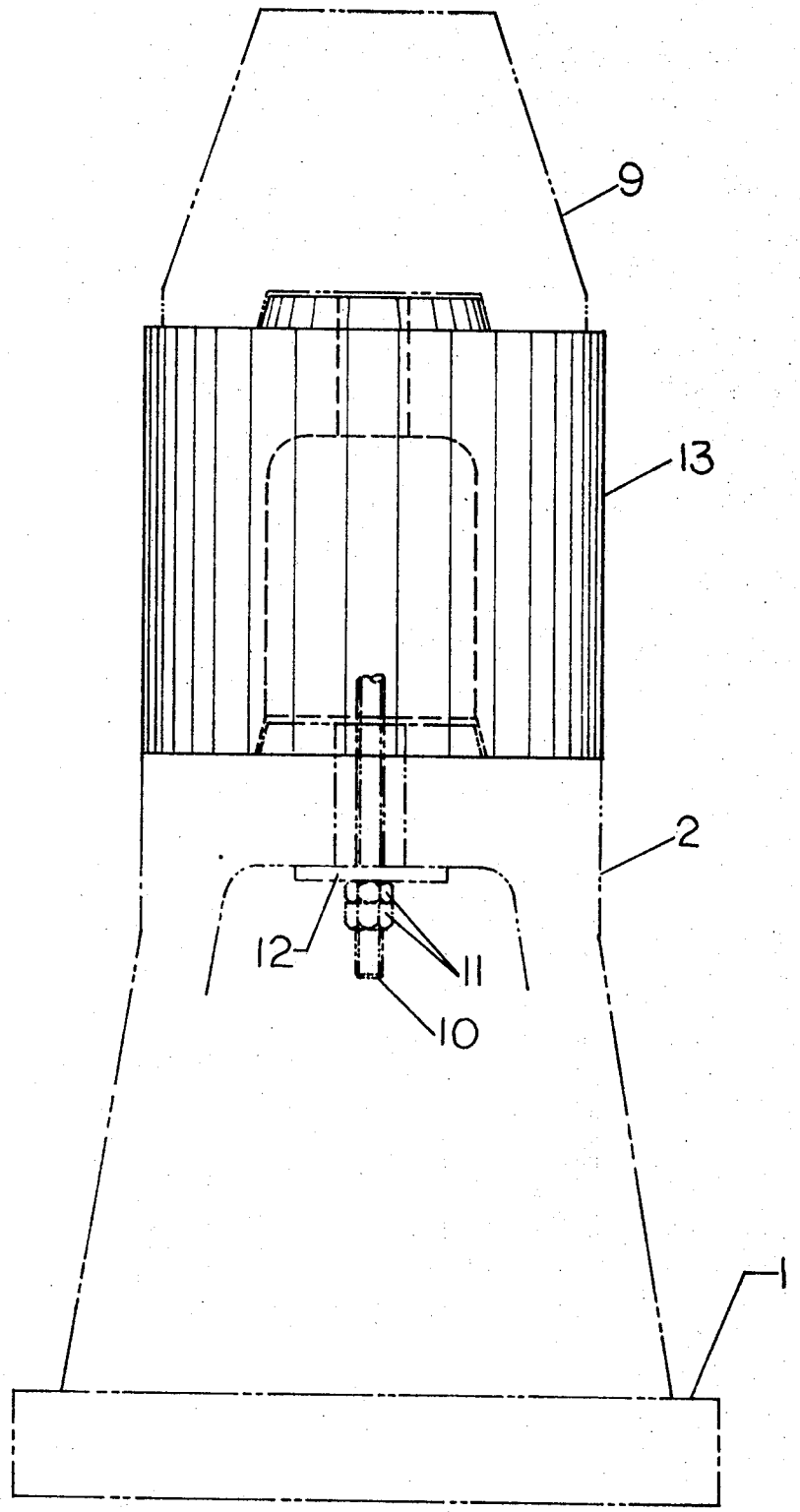


FIG. 5

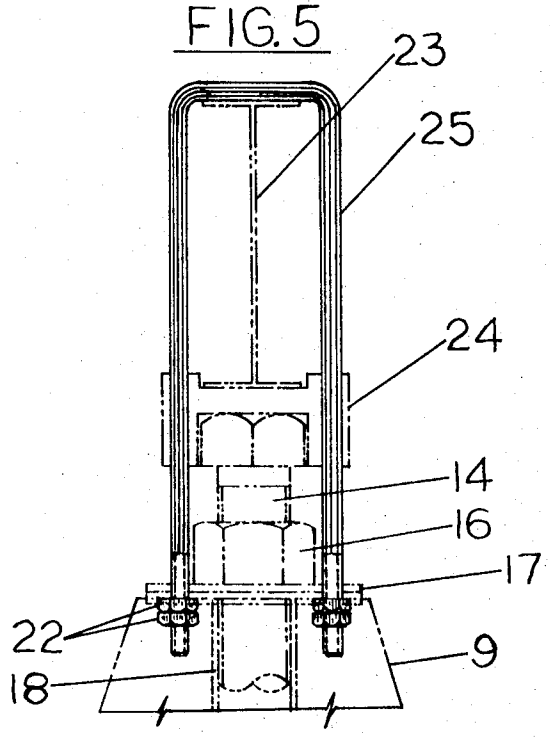


FIG. 6

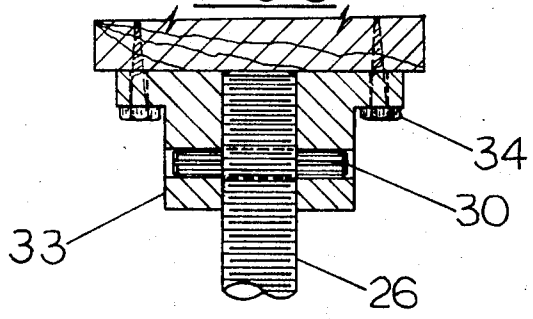


FIG. 8

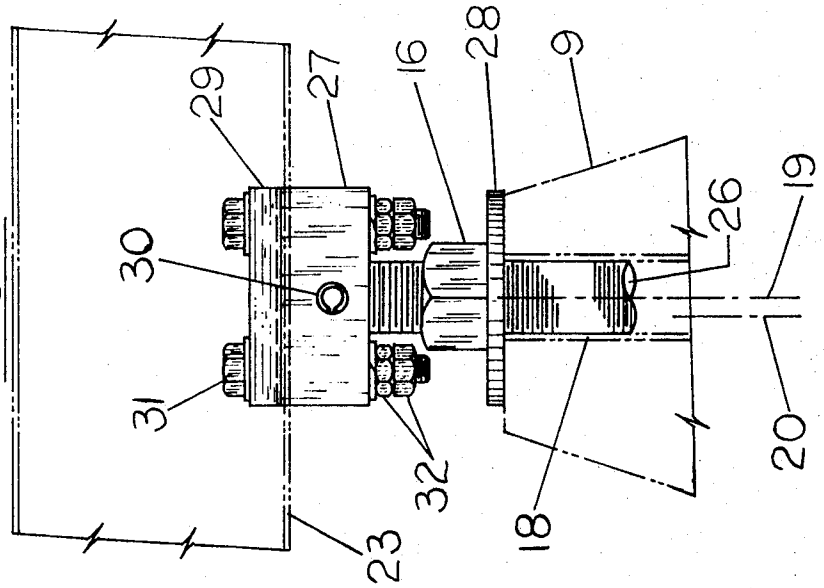

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FIG. 7

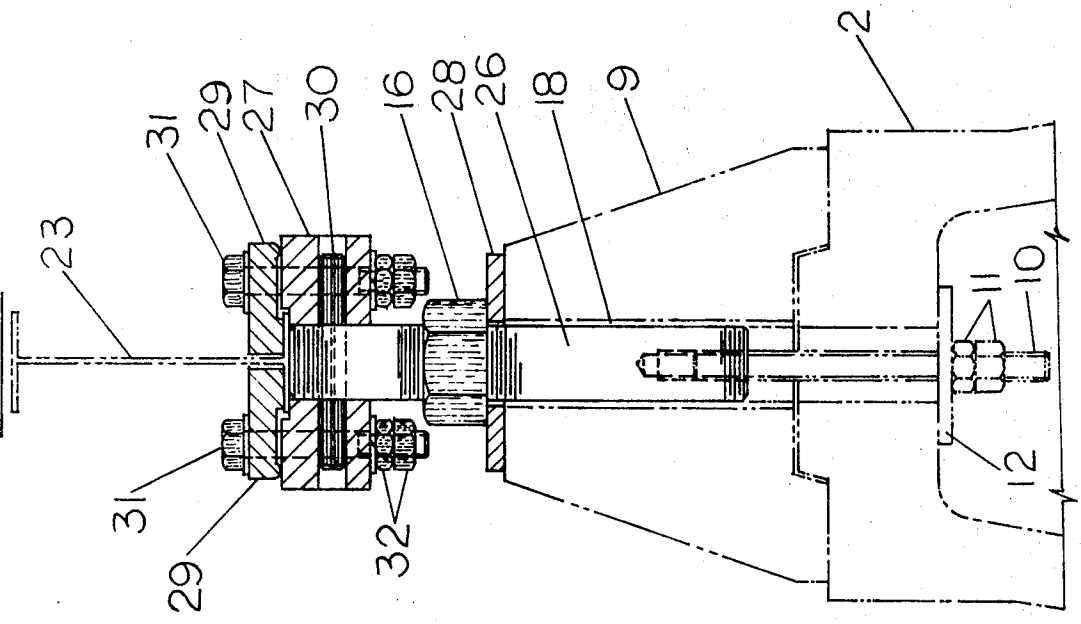

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FIG. 9

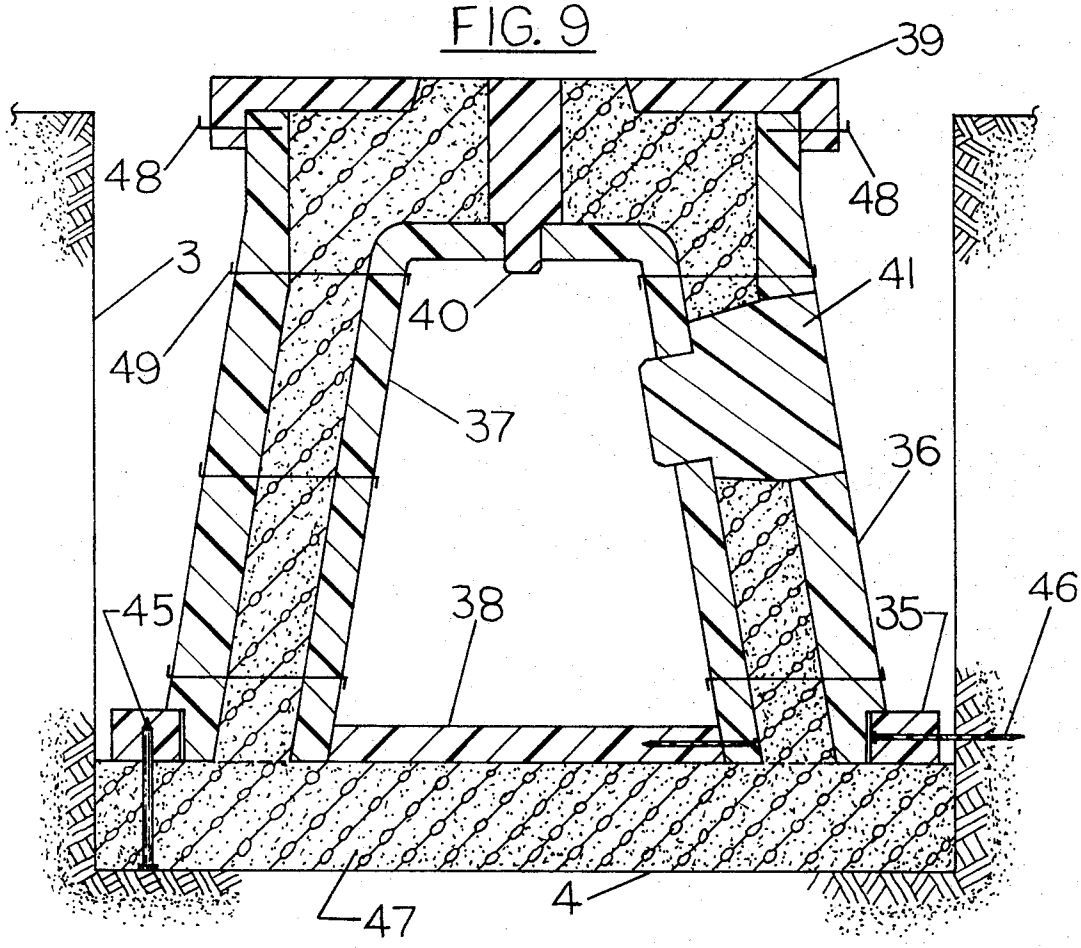
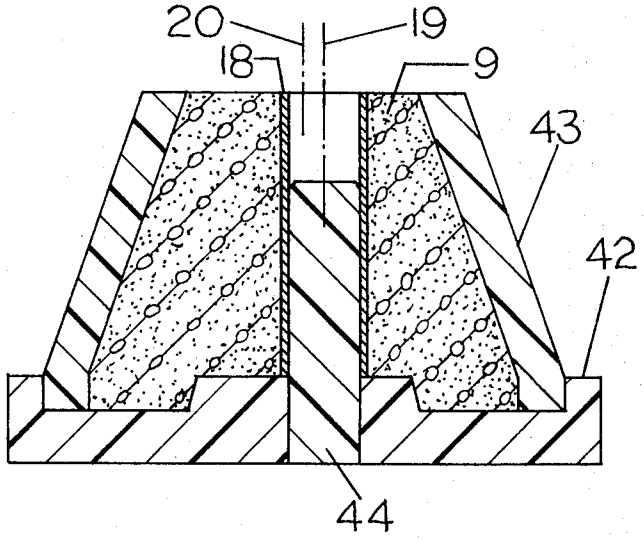


FIG. 10



MOBILE HOME LEVELING AND HOLD-DOWN SUPPORT

This invention relates to a new apparatus and improved installation methods to support, level and hold down mobile homes and other similar structures.

It is the present general practice to deliver a mobile home to the site, position it thereon, and then place a series of pillar supports made of cement or cinder blocks or some similar makeshift arrangement under the mobile home's supporting I-beams, preferably on clay or concrete, in an earth opening below the frost line. To level the structure, wood shims are placed between such supports and the mobile home I-beams.

The support aspect of the invented apparatus is multi-sectioned or monolithic, (not shown) pre-cast of concrete, plastic or other suitable substance, shaped to increase in size, from the top to the bottom, similar to a cone or pyramid.

Other integral parts of the invented apparatus include a jack screw, leveling nut, liner bushing, a compression rod with washer and nuts, a hold-down device comprised of U-type bolds and nuts, clamps or flanges, a hold-down tension or bearing plate, a retaining pad, and site casting forms.

The drawings illustrate the invented apparatus, its application, its installation and site casting forms.

FIG. 1 is an elevation view, with partial sectioned views of the assembled apparatus in a typical earth installation, viewed perpendicular to the end of the supported structure's longitudinal main I-beams.

FIG. 2 is an elevation side view of the top section of the support's leveling and hold-down device.

FIG. 3 is a sectional view of the lower section of the support showing an alternate earth installation.

FIG. 4 is an elevation view of the multi-sectioned support with an elevating spacer in place.

FIG. 5 is an elevation view of the alternate "U" type bolt hold-down device, viewed perpendicular to the supported structure's longitudinal main I-beams.

FIG. 6 is an elevation sectional view of the alternate flanged retaining pad.

FIG. 7 is an elevation cross-sectioned view of the alternate leveling and clamp type hold-down devices viewed perpendicular to the end of the supported structure's longitudinal main I-beams.

FIG. 8 is an elevation side view of the alternate leveling and clamp type hold-down device.

FIG. 9 is an elevation cross-sectional view of the site casting form with the combined sub and primary bases poured therein.

FIG. 10 is an elevation cross-sectional view of the site casting form with the support cap poured therein.

The invention has several objectives, but essentially its purposes are to support mobile homes and similar structures, level and hold down said supported structures in a fixed position and to facilitate the preparation of the site.

The number of invented leveling and hold-down supports, as shown on FIG. 1, required for installation of a mobile home or similar structure, is determined by the weight and length of said structure.

In application to a situation where the site is basically level the aforementioned leveling and hold-down supports are installed in earth openings at suitably spaced intervals to a pre-established elevation, in two or more parallel lines equivalent to the distance between the center lines of the main support beams of the supported structure.

The pre-cast sub-base 1 (See FIG. 1) or the bottom section of the support is first placed in an excavated or bored earth opening 3 to a pre-established elevation 4, having been sized to permit limited movement in said opening 3 for alignment. A pilot is provided on the top side of the sub-base 1 to engage and position the next section of the support, the primary base 2. A tapered dimple 5 is provided in the top of the sub-base pilot to aid in the alignment of the sub-bases in parallel lines. (The alternate sub-base 6 (See FIG. 3) is field poured with concrete, relative to an established elevation 4, to the extreme outer limits of the earth opening 3. It does not require a pilot or alignment dimple.)

The pre-cast primary base 2 (See FIG. 1), or the second section of the support is then placed directly upon sub-base 1, aligning and engaging therewith. The primary base 2 has been cast so that it increases in size from top to bottom to secure and stabilize its placement by soil pressure, while allowing for soil movement caused by seasonal temperature changes with minimal disturbance to its position. Its height will be such so that when placed upon the sub-base 1, their combined height will be approximately ground level 7. A cast cavity, opening to the bottom of the primary base 2, is sized at the entry thereof so as to engage the pilot of the sub-base 1. A pilot also is cast on the top surface of the primary base 2 to center and position the support cap 9, or the elevating spacer 13 (See FIG. 4). A cored hole on the perpendicular center line from the cavity through the top pilot of the primary base 2 is sized to accommodate the threaded compression rod 10, with nus 11 and washer 12. A tapered hole, sealed with plug 15, is cored through the primary base 2 wall to provide a means by which the said threaded compression rod 10 can be inserted into the cavity of primary base 2 and into the aforesaid cored hole where it can be screwed into the internal threads of jack screw 14. The said tapered hole also provides permanent access to the cavity, and the parts and devices contained therein. A binding concrete collar 8 is then poured to the outer limits of the earth opening 3, to permanently fix the position of the bases 1 and 2. When the required number of leveling and hold-down supports have been installed to this extent, the mobile home or similar structure is aligned over said leveling and hold-down supports.

The pre-cast support cap 9 or the top section of the invented apparatus is then placed upon the top surface of the primary base 2 with the pre-assembled jack screw 14, leveling nut 16 and hold-down tension plate 17 (See FIG. 2). The bottom surface of the support cap 9 has a recessed pilot to center said support cap 9 when it is placed upon the top pilot of the primary base 2. To assure uniform load distribution throughout the entire support and to properly seat the bottom surface of the support cap 9 upon the top surface of the primary base 2, the recessed pilot of the support cap 9 is slightly deeper than the top pilot of the primary base 2. A hole is cored off center through the support cap 9 to create an eccentric 19 condition and to accommodate the jack screw 14 and liner bushing 18. Additional alignment correction is provided with the eccentric 19 by rotating the support cap 9 about the perpendicular center line 20 of the primary base 2.

The description and purpose of the following integral parts of the invented apparatus are set forth in the normal sequence of installation.

The liner bushing **18** (See FIG. **11** is tubular in shape and cast integrally with the support cap **9.** It is sized on the inside to center and permit free movement of the jack screw **14.**

The hold-down tension plate **17,** on top of the support cap **9** (See FIGS. **1** and **2**), is a flat plate with both ends bent slightly downward (so that the U-type bolts **21** and hold-down nuts **22** are always contained therein), a clearance hole through its center for the jack screw **14** and slots for U-type bolts **21.**

The leveling nut **16** (See FIGS. **1** and **2**), in place on the jack screw **14,** stopped by the tension plate **17,** when rotated, will raise or lower the jack screw **14.**

The jack screw **14** (See FIG. **1**) is a fully threaded hex head bolt. The threaded end of the bolt is internally threaded to receive the threaded compression rod **10.** The jack screw **14** and leveling nut **16** enable the supported structure to be vertically positioned to attain precise leveling at the desired elevation.

The retaining pad **24** (See FIGS. **1** and **2**) is recessed on the bottom side to fit on the hex head of the jack screw **14** and grooved on the top side to allow the extreme edges of the main I-beam's bottom flange to fully enter for the purpose of restricting the lateral movement of the supported structure.

The U-type bolt **21** (See FIGS. **1** and **2**) is a formed rod, threaded on both ends. It is passed through holes drilled in the web of the main I-beam **23** and entered in the slots of each end of the tension plate **17,** holding down the supported structure after the hold-down nuts **22** have been tightened.

The fully threaded compression rod **10** (See FIG. **1**), after having been passed through the cored openings in the primary base **2** is screwed into the internal threads of jack screw **14.** The opposite end of the compression rod **10** extends down through the cored hole into the cavity of primary base **2.** The apparatus is then locked together with washer **12** and nuts **11,** which are installed and tightened through the cored tapered hole in the primary base **2** wall.

The taper plug **15** (See FIG. **1**) is inserted to seal the cored tapered hole in the primary base **2** wall after the supported structure has been leveled and the apparatus locked together. The exposed earth openings are then backfilled and tamped.

In a situation where the site is not sufficiently level, a pre-cast elevating spacer **13** (See FIG. **4**) is installed between the primary base **2** and support cap **9** to compensate for the elevation differential. Its top and bottom are equal in size to the top section of primary base **2.** A cored cavity, opening to the bottom of the elevating spacer **13,** is sized at the entry of said cavity to engage the top pilot of the primary base **2.** A pilot is cast on the top surface of the elevating spacer **13** and used to position the support cap **9.** A cored hole on the perpendicular center line is provided from the cavity through the top pilot of the elevating spacer to accommodate a threaded compression rod **10.** The other component parts shown in phantom lines (See FIG. **4**) are the same as previously shown on FIG. **1,** except for the compression rod **10,** which, in this instance, must be of greater length.

In lieu of U-type bolt **21,** U-type bolt **25** (See FIG. **5**) can be used. It is a formed rod and threaded on both ends. Instead of passing through the holes in the web of the longitudinal I-beam **23,** however, it is placed over the top of said I-beam and aligned so that the threaded ends enter the slots in the hold-down tension plate **17.** The supported structure is held down by tightening nuts **22.** The other component parts shown in phantom lines are the same as shown on FIG. **1.**

If a clamp-type hold-down device (See FIGS. **7** and **8**) is preferred instead of a U-type bolt, a jack screw **26,** retaining clamp pad **27,** bearing plate **28,** clamps **29,** roll pin **30,** bolts **31** and nuts **32,** are used in place of jack screw **14,** tension plate **17,** U-type bolts **21** and **25,** and retaining pad **24** (See FIGS. **1** and **2**).

The jack screw **26** (See FIGS. **7** and **8**) is a threaded rod with internal threads in one end to receive the threaded compression rod **10.** It is screwed into the retaining clamp pad **27** and fixed thereto by a roll pin **30.**

The retaining clamp pad **27** (See FIGS. **7** and **8**) contains an internally threaded through hole in the center thereof for jack screw **26,** and is grooved on the top side to allow the extreme edges of the main I-beam's **23** bottom flange to fully enter. It also contains two or more holes to allow the passage of bolts **31.** The clamps **29** are recessed on the bottom side and have one or more through holes to allow passage of the bolts **31.** The bolts **31** are passed through the retaining clamp pad **27** and clamps **29,** and nuts **32** are tightened to restrict lateral movement of the supported structure and hold down the same.

The bearing plate **28** has a through hole in the center to allow passage of jack screw **26.** When placed upon support cap **9,** it stops the leveling nut **16** and aids in locking together the invented apparatus.

The component parts shown in phantom lines on FIGS. **7** and **8** are the same as previously described on FIGS. **1** and **2.**

When using the invented apparatus for supporting frame-type structures, the flanged retaining pad **33** (See FIG. **6**) is used in lieu of retaining pad **24.** The flanged retaining pad **33** contains an internally threaded through hole in the center to accept jack screw **26,** and is fixed thereto by roll pin **30.** It also contains two or more through holes in the flange for fasteners **34** to attach the frame-type structure to the support apparatus.

Whereas the discussion prior hereto dealt solely with precast multi-support sections of the apparatus and the assembly thereof, the following is intended to describe and explain the use of forms that will allow for site pouring and/or casting of the support's sections.

To pour and/or cast a combined sub-base and primary support base **47** with the aforesaid forms (See FIG. **9**), an alignment ring **35** is positioned in an earth opening **3** relative to an established elevation **4** with vertical **45** and horizontal **46** nail supports. Concrete is then poured to the bottom of the alignments ring **35.** The pre-assembled form, consisting of a primary base outer shell **36,** primary base core **37,** primary base seal core **38,** jack screw core **40** and tapered plug core **41** (aligned with spacers, not shown) and held together with wires **49,** is placed in the inside diameter of the alignment ring **35,** until the flange of the primary outer shell **36,** rests on top of said alignment ring **35.** Wire mesh for reinforcement is placed in the cavity between the primary base outer shell **36** and primary base core **37** and concrete is then poured into said cavity. The

primary base cap form **39** is placed upon the primary base outer shell **36** and staked in place with wire **48** or nails. Concrete is then added to fill the cavity and form an alignment pilot. After curing, core aligner wires **49**, cap stake wires **48** or nails, and tapered plug core **41** are removed. The primary base cap form **39** is then removed, followed by the removal of the primary base outer shell form **36** and alignment ring **35.** Jack screw core **40** is then driven into the cavity of the support base **47,** and a sufficient amount of the primary base core **37** is broken away to allow the compression rod washer **12** (not shown) to seat against the primary base surface.

To pour and/or cast support cap **9,** the following forms, flange **42,** outer shell **43,** and sleeve pilot **44,** must be assembled as shown on FIG. **10.** However, before the concrete can be poured into the cavity of the outer shell form **43,** a liner bushing **18** must be placed over the sleeve pilot **44** and wire mesh inserted in said cavity. Concrete is then poured to the top of the outer shell form **43.** (The resulting support cap **9** is identical to that shown in FIG. **1,** including the eccentric **19** relative to the perpendicular center line **20** of the primary base **2.**)

The elevating spacer **13,** as shown on FIG. **4,** may also be cast with forms, not shown, similar to the following forms, primary base outer shell **36,** primary base core **37,** primary base cap **39,** jack screw core **40** and flange **42,** shown on FIGS. **9** and **10.**

Inasmuch as the terms and expressions which have been employed in the specifications are used as terms of description and not of limitation, and there is no intention in the use of such terms and expressions of excluding any equivalents of the features shown and described or portions thereof, since it is recognized that various modifications are possible within the scope of the invention claimed.

What we claim is:

1. A support for a mobile home or similar structure having a structural frame at its underside, comprising:

a base disposed and held within a post hole bored in the ground and adapted to underlie said structural frame, said base being of two-part formation, including a lower pad resting on the ground surface defining the bottom of the bored hole, and an upper hollow member resting on said pad and having an outer wall extending upwardly from said pad to a smaller transverse dimension, said upper hollow member having a transverse wall at its upper end providing a support surface on its outer side,

a concrete collar around the periphery of said pad and said outer wall to hold said base in position within said bored hole,

a cap member having its lower end seated on said support surface, said cap member extending upwardly therefrom,

a jack screw slidably carried by said cap member for upright axial movement, an upper portion of said jack screw extending upwardly beyond the upper end of said cap member and carrying a retaining pad upon which said structural frame rests,

a leveling nut threaded on said jack screw upper portion and bearing against said cap member upper end, and

a rod having its upper end threaded into the lower portion of said jack screw, said rod extending through an opening in said transverse wall of said upper hollow member and having an abutment within said hollow member, said abutment being adapted to bear against the inner side of said transverse wall to limit upward movement of said jack screw.

2. The construction according to claim **1,** wherein the outer wall of said upper hollow member is conical, tapering from a larger diameter at said pad to a smaller diameter at the top of said hollow member, the combined height of said pad and said hollow member being such relative to the depth of the bored hole so that the top of said hollow member, which forms said transverse wall, is substantially flush with the ground level surrounding said hole,

said concrete collar extending around the periphery of said pad and the lower portion of said conical wall, said hollow member being locked in place by earth tamped therearound and filling said hole.

3. A support for a mobile home or similar structure having a structural frame at is underside, comprising:

a base connected to the ground and adapted to underlie said structural frame, said base being hollow at its upper end and having a transverse wall thereat providing a support surface on its outer side,

a cap member having its lower end seated on said support surface, said cap member extending upwardly therefrom,

a jack screw slidably carried by said cap member for upright axial movement, an upper portion of said jack screw extending upwardly beyond the upper end of said cap member and carrying a retaining pad upon which said structural frame rests,

a leveling nut threaded on said jack screw upper portion and bearing against said cap member upper end, and

a rod having its upper end threaded into the lower portion of said jack screw, said rod extending through an opening in said base transverse wall and having an adjusting nut threaded thereon and disposed within the hollow of said base, said nut being adapted to bear against the inner side of said base transverse wall to limit upward movement of said jack screw, and said base having an opening in its side wall to provide access to its hollow interior and said adjusting nut.

* * * * *