

- [54] **MOORING APPARATUS**
- [75] Inventors: **Foy S. Anderson; William L. Davis; William G. Loye, Jr.**, all of Memphis, Tenn.
- [73] Assignee: **Mobile Home Mooring, Inc.**, Memphis, Tenn.
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- [51] Int. Cl. **E04h 9/14**
- [58] Field of Search. **52/23, 148, 146; 248/361 A; 280/179 A**

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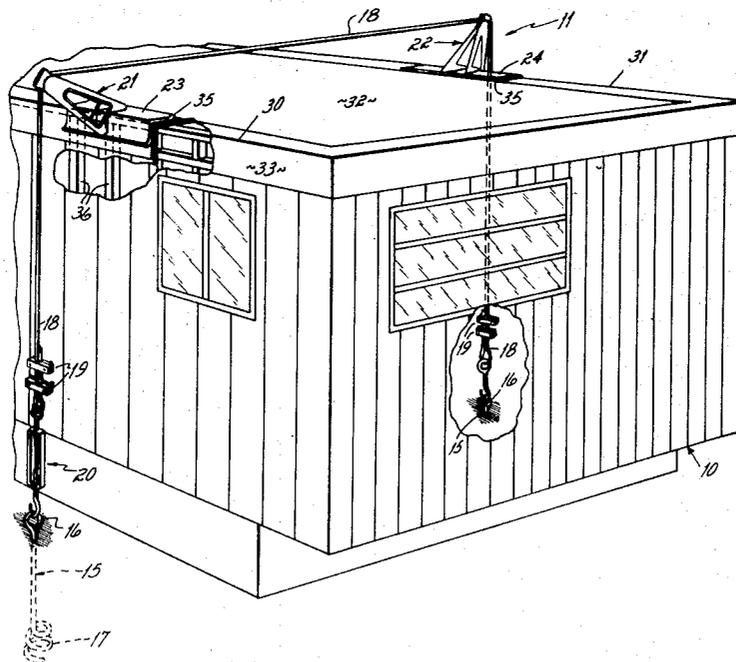
Primary Examiner—Price C. Faw, Jr.
Attorney—Edward B. Evans et al.

[57] **ABSTRACT**

A mooring apparatus, for securely mooring mobile homes and other portable structures and the like against windloads, includes anchors generally disposed on opposite sides of the structure and a cable positioned generally over the structure and secured at its ends to the anchors. Brackets are provided on the structure which hold the cable away from the structure so as not to damage it, and yet impart a mooring force from the cable to the structure. The brackets are provided with gripping surfaces for engaging the cable and halting descent of the bracket should it fall from its position. A tensioning device is included for adjusting the tension on the cable.

3 Claims, 5 Drawing Figures

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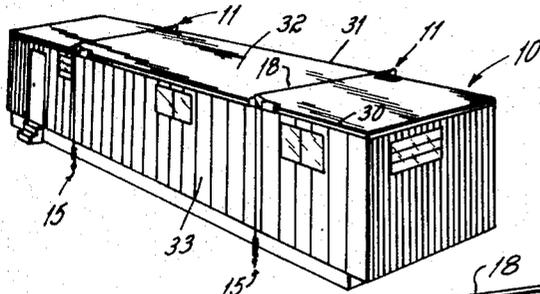


Fig. 1

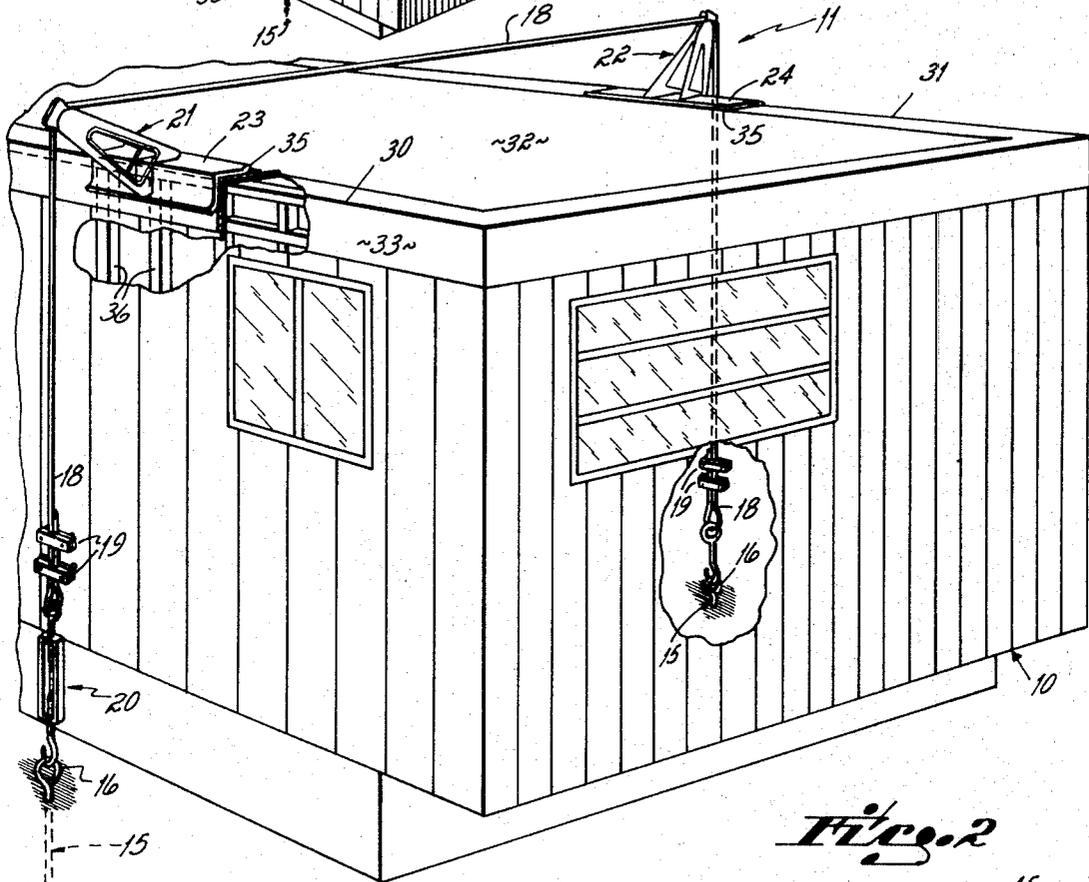


Fig. 2

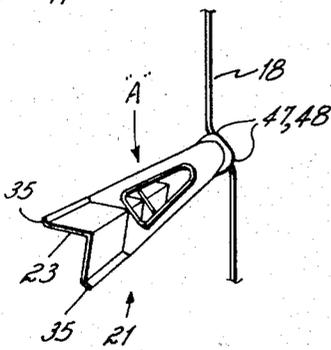


Fig. 3

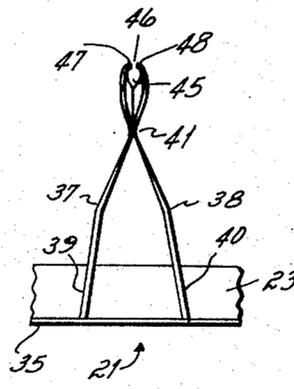


Fig. 4

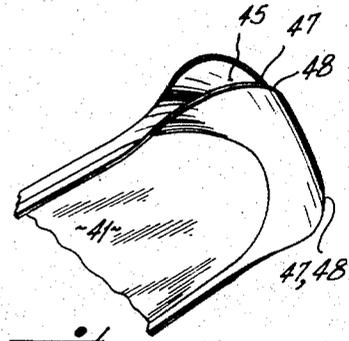


Fig. 5

INVENTORS
 Foy S. Anderson
 BY William L. Davis
 William S. Love, Jr.
 Wood, Heiron, Evans
 ATTORNEYS

MOORING APPARATUS

The invention relates to mooring apparatus and more particularly to apparatus for mooring structures such as mobile homes, temporary or portable buildings and the like.

While the invention may be utilized with a various number of structures, it is hereinafter described with its use in connection with mobile homes or other portable or temporary types of structures.

It is well known that structures such as mobile homes or temporary buildings, for instance, are generally not firmly constructed with relation to the ground as are other types of structures which are permanently or securely constructed on foundations, piers or other supports. As a result of this infirmity, such former structures cannot bear the same resistance to wind loadings as do the latter permanent structures and are susceptible to being moved and severely damaged or destroyed by winds.

In certain areas of this country, as in others throughout the world, the probability that winds of damaging force will occur at times throughout the year renders the use in these areas of such mobile homes or the like impractical. In many places, winds strong enough to overturn or further damage or destroy these homes are common. The owners of such homes or structures in these areas are thus faced with the constant fear of such occurrences. Even further, they must pay increased premiums for adequate insurance coverage. The possibility of severe damage and the actuality of increased insurance expenses are detrimental to the economy of such structures.

While merely tying down a portable structure with such cables may solve some problems, we have found that, in many cases, the cable itself may damage the structure as it is blown against the mooring force of the cable.

It is thus desirable to provide a mooring structure which is efficient and which does not itself cause damage to the structure with which it is used.

We have found that it is possible to securely moor mobile homes or like structures against the forces of the wind and thereby greatly 'increase' their windloading resistance without damage to the structure. In many cases it is possible through the use of our invention to securely moor a mobile home against greater windloadings than have occurred or are to be expected in the various geographical areas, and thereby to protect the structure against damage due to winds and to correspondingly lower the premiums for insurance in the particular area.

Briefly, my invention includes at least a pair of anchors or anchoring points to which an anchoring cable is attached. The anchoring points are located on generally opposite sides of a structure and the cable is placed over the structure to hold it down. A tensioning means is utilized to tighten the cable so that it exerts a mooring force on the structure.

For holding the cable away from the structure in order to protect it from damage and for imparting the mooring force from the cable to the structure, cable supporting bracket means are removably placed on the structure. Usually, two brackets for each cable are placed generally on the top of the structure above the respective anchor points. Each bracket is positioned at

the juncture of the top of the structure and a respective side wall so as to position the cable outwardly of the structure's walls and above the structure's top.

The mooring face exerted by the cable and the anchors is transmitted to the structure through the brackets which are positioned in areas of the structures which can bear the greatest strains.

In order to keep a bracket from falling from the structure should the cable become untensioned, for instance during assembly or disassembly of the mooring apparatus, the bracket is provided with a cable receiving channel and associated gripping surfaces.

If the bracket should fall from the structure, these gripping surfaces would contact the cable and halt the bracket's descent. Engagement of the surfaces with the cable is caused by the tendency of the bracket's heavy seating end to turn the cable receiving channel, located on the bracket's other end, about the cable, thereby causing the gripping surfaces to bind on or grip the cable and stop the bracket's descent. This feature makes the assembly of the mooring structure a safe operation and keeps the bracket from falling and causing property or personal injuries should the tension on the cable be released.

As many cables, brackets and anchoring points may be utilized as required, it being understood that each cable is anchored at its ends on generally remote sides of a structure and that usually two brackets are utilized, with a typical structure, in conjunction with each cable. The shape of some structures may require a different number of anchoring points or brackets.

It is thus one object of my invention to provide mooring apparatus for mobile homes or the like.

It is a further object of my invention to provide apparatus for mooring a mobile home or like structure against windloadings which are greater than the structures can independently endure without incurring severe damage or destruction.

It is a further object of my invention to provide an inexpensive mooring apparatus for mobile homes and the like which maintains the economy of utilization of such structures in areas continually susceptible to damaging winds.

A yet further object of my invention is to provide a bracket for use in a mooring apparatus which bracket protects the structure against damage from an anchoring cable and yet efficiently imparts the mooring force of such cable to the structure.

A further object of my invention is to provide a bracket for use with a mooring apparatus which bracket is provided with means to grip an associated anchoring cable and support the bracket should it become dislodged from its predetermined position or should the cable tension be relaxed.

These and other objects and advantages will become readily apparent to those of ordinary skill in the art from the following detailed description and drawings in which:

FIG. 1 is a general perspective view of a structure provided with a mooring apparatus at each end,

FIG. 2 is a perspective view showing the structural details of a mooring apparatus in operative position with anchor points on opposite sides of the structure, as shown by a cutaway,

FIG. 3 is a view showing the cable supporting bracket hanging from and gripping a cable,

FIG. 4 is a side view of the cable supporting bracket showing the cable receiving channel, and

FIG. 5 is a perspective view showing the cable receiving channel and cable gripping surfaces of the bracket.

Referring to FIG. 1 of the drawings, there is shown at 10 a mobile home provided with a mooring apparatus 11 at each end of the home. While the present invention will be described in its preferred use with a mobile home, it may be utilized with any temporary or portable building or any structure where it is desired to securely moor it to the ground. Furthermore, any number of the preferred embodiment of the invention may be utilized as needed.

The details of the mooring apparatus of the invention in operative position are shown in FIG. 2. Each apparatus includes two similar anchor members with shanks 15 having one end formed into an eye 16 and the other into a coil 17. Although a variety of anchors may be utilized, we have found the anchor shown to be preferable as it may be utilized in a variety of soils.

FIG. 2 shows two anchors 15 located on opposite sides of the structure. The anchors are made from a $\frac{5}{8}$ inch cold rolled steel rod and are approximately 48 inches in length. The coils are about 4 inches in diameter and are about $14\frac{1}{4}$ inches in overall length. We have found that such an anchor provides a vertical pullout resistance of 4,500 pounds.

In addition to suitable anchors, each mooring apparatus includes an anchor cable 18, clamps 19, cable tensioning means 20 and brackets 21 and 22. Brackets 21 and 22 are similarly constructed and include structure engaging structural angle portions 23 and 24, which in the preferred embodiment are 11 gauge cold rolled steel, $3\frac{5}{16} \times 3\frac{5}{16}$ inches by 21 inches long. These angles are positioned on edges 30 and 31 of the mobile home. It will be noted that these edges are formed by the juncture of the top 32 of the home and front wall 33 and by the top 32 and the rear wall (not shown), respectively. Each angle is thus seated at the top of a wall and indirectly abuts the wall studs 36. This area is very strong and is the preferable support area for the type of structure shown. Each angle may have flanged edges 35 in order to protect the surfaces against which the angles meet.

The brackets 21 and 22 both further include cable supporting portions comprising sides 37 and 38 as seen in FIG. 4. These sides are stamped from eleven gauge cold rolled steel and are welded into their respective structural angle at a right angle thereto such as at 39 and 40. The sides are joined at 41 and are shaped to form a cable supporting portion or cable receiving channel 45 as shown in FIG. 5, which is slotted as at 46 (FIG. 4). The slot has tapered or rounded ends which define cable gripping surfaces 47 and 48. These are rounded so that the slot tapers from a relatively wide opening at its ends to a narrow central portion of less width than the diameter of a cable to be held therein. The function of these surfaces will be hereinafter described. The brackets have been tested to withstand a cable tension of 15,500 pounds.

While various cables may be utilized, $\frac{3}{8}$ inch galvanized aircraft cable with a minimum breaking strength of 14,400 pounds has proved suitable.

The cable tensioning means 20 of the preferred embodiment comprises a turnbuckle which may be a $\frac{3}{8}$ inch by a 9 inch hook and eye turnbuckle as well known in the art.

It will be understood that, while the various materials used in the elements of the invention have been specified in the preferred embodiment, any suitable materials or sizes thereof may be used.

In order to install a mooring apparatus 11, the anchor members 15 are first positioned on opposite sides of the structure to be moored. These may be simply screwed into the ground or a shallow hole dug for them and later filled and tamped after the anchor is screwed into the soil so that its eye 16 is located at ground level. Any other means of anchoring, as known in the art, may be utilized.

The cable 18 is then threaded through the eye 16 of one anchor such as that shown in the cutaway view of FIG. 2 and is non-yieldingly clamped by clamps 19.

Brackets 21 and 22 are then positioned on edges 30 and 31 and the cable is strung through channels 45 of the brackets. The cable is then attached by way of clamps 19 to one end of turnbuckle 20. The other end of turnbuckle 20 is attached to the eye 16 of anchor 15 and is turned so as to tension the cable between the anchors and about the structure.

As the cable is tensioned, it imparts a mooring force to the mobile home through brackets 21 and 22 as will be appreciated by those of skill in the art. This force tends to hold the mobile home secure against windloadings applied to the vertical walls thereof.

We have found that, in a hurricane force wind of about 74.75 miles per hour, a typical mobile home vertical wall of 10 feet by 60 feet would be subjected to approximately 9,000 pounds center stress and thus the mooring apparatus described is sufficient to maintain secure a typical mobile home even in winds of hurricane magnitude. As stated, various anchors may be utilized to increase the stress resistance of the apparatus.

The brackets are provided with the gripping surfaces 47 and 48 to render their use safe during assembly or disassembly of the mooring apparatus or in the event that the tension in a cable becomes relaxed. It is noted that the brackets are secured to a mobile home only by virtue of the cable tension and, if this is relaxed, the bracket may fall from its position, causing property or personal injury.

If this should occur, the relatively heavy end which is attached to the structural angle 23 (FIG. 3) tends to fall or rotate in the direction of arrow A and turns the cable receiving channel 45 longitudinally about the cable 18. This causes the interior surfaces of channel 45 to bind against the cable and, furthermore, the tapered surfaces 47 and 48 tend to grip the cable in a wedging fashion. This action halts the bracket's descent and it merely hangs onto the cable as shown in FIG. 3.

It can thus be readily appreciate that my invention provides a mooring apparatus for securely and safely mooring a mobile home or the like in severe winds and without damage to the home from the mooring apparatus itself.

While I have described a preferred embodiment of my invention in detail, various modifications will be apparent to those of skill in the art and I intend to be bound only by the appended claims.

I claim:

1. A mooring apparatus for structures such as mobile homes or the like comprising

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at least one pair of corresponding anchors, each anchor in a pair being disposed on generally opposite sides of a structure to be anchored,

a cable extending from one of said anchors in a pair to its corresponding anchor on the opposite side of said structure, the cable being connected to each anchor so that it can be tensioned, and

bracket means for locating said cable in a predetermined position about said structure and for holding said cable away from said structure while imparting a mooring force exerted by the cable to said structure when said cable is tensioned, said bracket means including

a cable supporting portion,
a structural angle for seating the cable supporting portion on the structure to be moored such that the supporting portion extends above the top of the structure and beyond the respective wall of said structure to thereby support said cable away from said structure, and

gripping means for gripping the cable in order to prevent said bracket means from sliding down the cable.

2. Apparatus as in claim 1 wherein said gripping means includes

a channel located at the end of the cable supporting portion for receiving the cable, and gripping surfaces associated with said channel and located to gripingly engage the cable when the bracket means hangs from said cable independently of said structure.

3. A mooring apparatus for structures such as mobile homes or the like including a cable which in use is located about the structure and anchored and tensioned to moor the structure, said apparatus comprising

bracket means for locating said cable in a preselected position about said structure and for holding said cable outwardly from said structure while imparting a mooring force exerted by the cable to said structure, said bracket means including

a structure engaging portion,
a cable supporting portion extending from said structure engaging portion and slidably receiving said cable, and

gripping means on said cable supporting portion for gripping said cable in order to prevent said bracket means from sliding down the cable.

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