June 17, 1969 J. L. BEAUPRÉ 3,449,874

HOUSE ANCHORAGE

Filed Aug. 21, 1967 Sheet 1 of 2

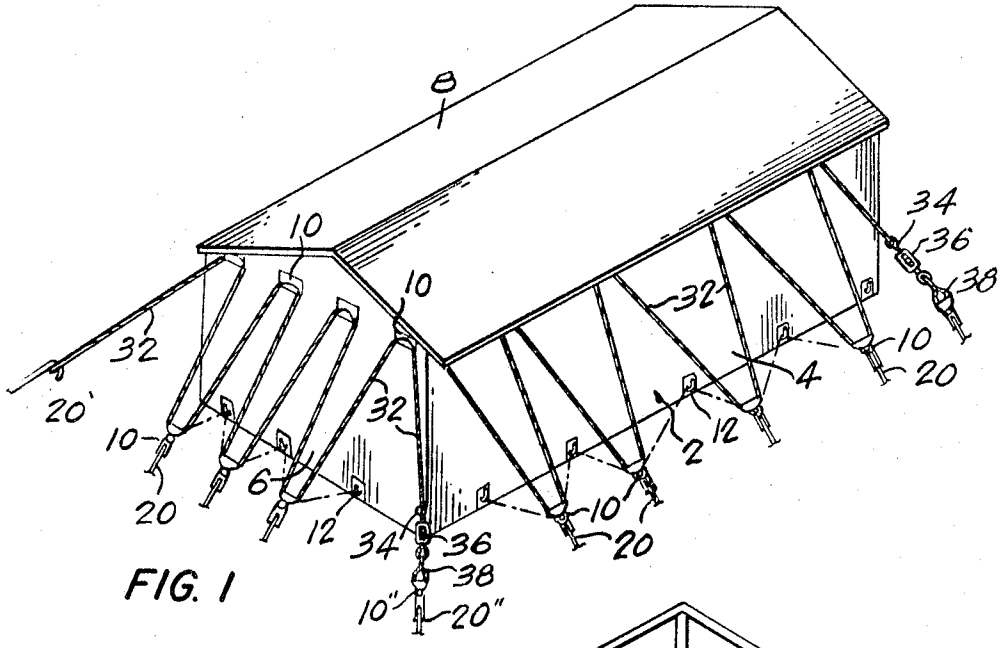


FIG. 1

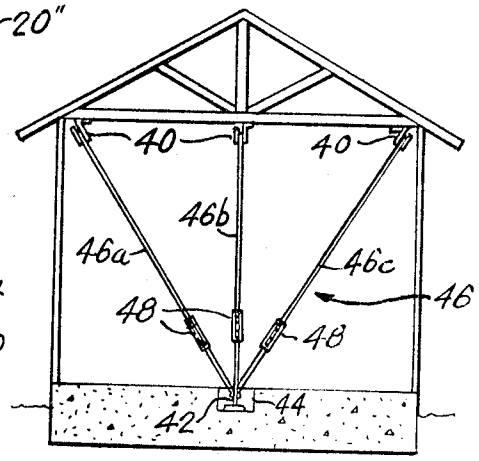


FIG. 7

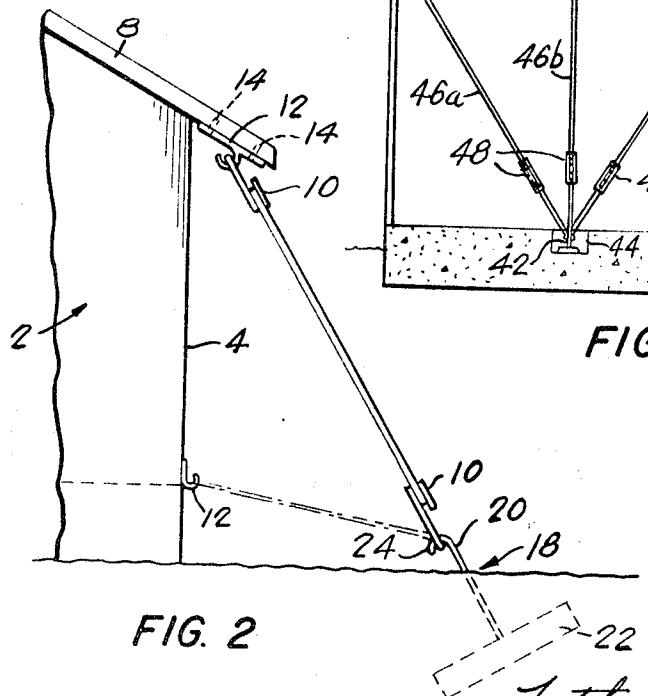


FIG. 2

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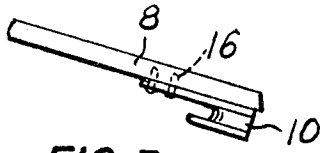


FIG. 3

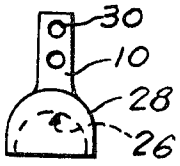


FIG. 4

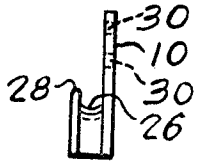


FIG. 5

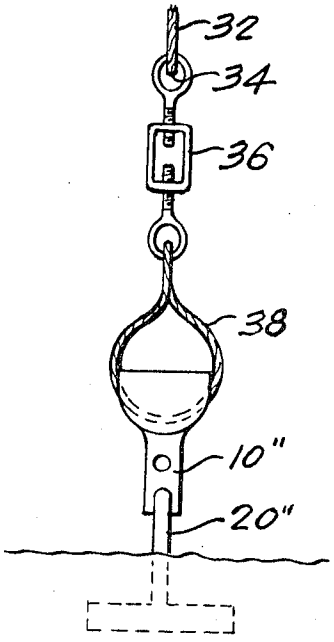


FIG. 6

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HOUSE ANCHORAGE

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U.S. Cl. 52—149 5 Claims

ABSTRACT OF THE DISCLOSURE

An anchorage assembly for supporting and strengthening building structures during extreme conditions including anchor means permanently secured to and around the structure at a distance above ground level and anchor means provided in the ground around the structure, and a length of cable to be led alternatively around the building anchors and the ground anchors and a cable tightening device to apply tension evenly along the length of cable.

The present invention relates to anchoring means for securing and strengthening a building or other structure during high winds or flooding.

Particularly the invention relates to apparatus to support and strengthen a building structure during extreme weather and flooding conditions, which may easily and quickly be positioned when danger threatens and then easly and quickly dismantled after the danger has passed so as not to detract from the appearance of the structure. The invention is of particular value in areas of reoccurring extreme conditions such as flooding, hurricanes, tornados, earthquakes, etc. but is a valuable addition to any structure even is less affected areas.

The invention proposes permanently positioning a plurality of anchoring means such as slip plates or pulleys, or slip plate or pulley retaining means on a building structure, and also permanently positioning a plurality of ground anchors around the house. The ground anchors may be suitably camouflaged and the building plates suitably positioned or designed to maintain a pleasing appearance to the structure. When danger threatens a cable or wire rope or similar strong length of material, which is stored away when not in use, is positioned alternatively around the building structure anchor means and ground anchors in izg-zag fashion and tightened by suitable means. The cable may be of a length to run zig-zag completely around the structure thereby necessitating the use of only one tightening means; or cable lengths to run the length of only one side of the structure can also be used, in which case a tightening device for each side will be necessary.

The use of a single cable to support each side of a structure enables the use of a single tightening device for each side with the advantage that the cable sections supporting one side of the structure are of equal tension. This is of considerable importance in maintaining a wall or side in relative and stable position throughout its length during periods of extreme stress, and one that would be most difficult if not impossible to achieve if each cable length running between the structure and the ground anchor were tightened individually.

Alternatively and as a preferred arrangement, a single cable length running completely around the structure is used. With this arrangement only one tightening device need be used with the added advantages that all supporting cable sections are of equal tension, and to a lesser extent that the cost of the apparatus will be minimized.

It is known to employ cables or ropes extending between structure and a ground anchor to support the structure during extreme weather condtions. In all of these

past methods however each cable section extending between the structure and the ground anchor was tightened individually. This required caution if one was to avoid damaging the structure by excessive cable tightening even before the storm danger arrived, and even if this damage was avoided each cable length supported the structure to a differing degree thus allowing some flex and relative movement along the length of one side during excessive winds or flooding with resultant wall damage.

Moreover in the known methods, the apparatus is difficult and time-consuming to erect, and in some cases where the supporting cable passes completely over the structure, it is necessary to climb the structure to position the cable correctly.

It is the principal object of the present invention then to provide anchoring apparatus for supporting and strengthening a building structure against the dangers of extreme weather conditions such as high winds, flooding and earthquakes.

It is a further object to provide anchorage means to support and strength building structures during extreme conditions, which may easily and quickly be installed when danger threatens and as quickly and easily be removed when the danger has passed.

It is still a further object to provide building structure anchoring means to strengthen and support the structure against extreme forces, and comprising a plurality of anchoring means permanently mounted and secured to the structure, and a plurality of ground anchoring means positioned around the structure, and a length of cable or wire rope to be positioned alternatively around a structure anchor and a ground anchor along at least one complete side of the structure and means to tighten the cable.

It is still a further object to provide building structure anchoring means comprising a plurality of structure anchors permanently secured to a building structure and a plurality of ground anchor means positioned around the structure, and a length of cable or wire rope running completely around the structure alternatively between a structure anchor and a ground anchor and means for tightening the cable to apply tension to the cable uniformly all around the building.

It is still a further object to provide building structure anchoring means located within the building whereby, under extreme weather conditions the structure can be secured from the inside.

The invention will now be described in more detail with reference to the accompanying drawings wherein:

FIGURE 1 is a perspective view of a building structure supported and strengthened by the anchoring means of the present invention;

FIGURE 2 is an elevation view along one side of the building structure showing an anchor arrangement secured to structure and a ground anchor assembly and a portion of a cable length running therebetween;

FIGURE 3 illustrates an alternative form of an anchor structure mounted on a building structure;

FIGURE 4 is a front view of a slip plate designed for use with the means of the invention;

FIGURE 5 is a side view of the plate shown in FIGURE 4; and

FIGURE 6 is one form of tightening means which may be used;

FIG. 7 is an outline sectional view of a building structure as secured from the inside.

Referring specifically to the drawings numeral 2 indicates a building structure generally, and having side 4 and end 6 walls, and a roof 8.

A plurality of anchoring means are permanently secured along the ends and sides of the building structure at a distance above ground level. In the drawings the

anchoring means slip plates **10** are secured to the end or gabled wall of the structure by means of bolts or screws or other suitable means (not shown) and slip plate retaining hooks **12** are permanently secured by means of screws **14** to the ends of the rafter members under the eaves as is clearly shown in FIGURE 2. Alternatively the slip plates **10** may be permanently fastened by screws **16** directly beneath the eave in the manner as shown in FIGURE 3. A similar slip plate retaining hook arrangement can be used along the gabled end **6** of the structure if desired.

Of course the exact positioning and style of the anchors on the building structure will depend on the design of the building structure and whether the roof is gabled, hipped, etc.

A slip plate **10** suitable for use with the invention is shown in FIGURES 4 and 5, and this slip plate may be used both on the gabled end **6** as shown in FIGURE 1, or beneath the eaves as shown in FIGURES 2 and 3. Moreover a similar slip plate can be used with the ground anchor which is explained in more detail below. The use of the same slip plate configuration in all three applications lessens the initial cost of the anchoring means and provides for ease and speed in erection.

The ground anchoring means generally indicated at **18** which are spaced from and around the structure are shown in FIGURE 2 to simply consist of a rod **20** secured at its lowermost end to a cross-piece **22** and curved at its uppermost end to provide a hook **24**. The cross-piece **22** may be of metal secured to the rod **20**, or may be poured concrete or the like having the end of the rod embedded therein. Although the ground anchor is permanently positioned the hook **24** end of the rod may be suitably camouflaged or recessed slightly below ground level so as not to distract from the general overall appearance of the landscaping. Of course the ground anchor assemblies may take any suitable shape, and the scope of the invention should not be limited to any specific configuration.

The ground anchors **18**, and slip plates **10** or slip plate retaining means **12** are permanently secured to the building structure where they do not cause any appreciable distraction from the overall appearance.

The slip plates **10** are shown in detailed view in FIGURES 4 and 5. The slip plates are grooved in a semi-circular manner as at **26** to receive a support cable and are provided with an increased lip **28** to hold the slack cable as it is being led from one plate to the next, and also with apertures **30**. When the slip plates are themselves permanently secured to the building structure the apertures **30** are used for the bolts or screws, but if retaining hooks **12** are permanently fastened to the structure as in FIGURE 2 the apertures are simply used to hook the plates on the plate retainers **12**.

The apertures in the slip plates are also used to secure the plates to the ground anchor hooks as shown in FIGURE 2.

In place of the slip plates specifically shown in the drawings, pulley type assemblies could be used as well as other designs of slip plates. However it has been found that the slip plates **10** shown are very satisfactory for the sake of function and cost of production and ease of installation and removal.

When a storm threatens and building damage may result a cable or wire rope is led alternatively between the slip plates on the building and those on the ground and tightened to provide the necessary support.

FIGURE 1 shows the supporting of the end **6** of a building with one length of cable **32**, and the supporting of one side **4** with another length of cable.

The cable **32** is secured to a ground anchor rod **20'** (or to a slip plate), and then alternatively led around the building anchors and the ground anchor and secured to a ground anchor rod **20''**. The cable **32**, which has beforehand been finished to the correct length to shorten assembly time in the event of an emergency, is provided with suitable tightening means such as the arrangement shown in FIGURE 6. In this drawing the end **34** of the cable **32** is attached to a simple turn-buckle tightening assembly **36** which in turn is connected by cable loop **38** to a slip plate **10** and hence to the ground anchor. By turning the turn-buckle **36** a proper tension may be introduced into cable **32**, and as cable **32** is one continuous length each section of the cable extending between the structure and the ground anchor will have a constant tension and the support offered along the entire length of wall **6** will be uniform.

A similar arrangement is used along each side or end wall of the house, and if the house is four-sided four lengths of cable and four tightening means will be required.

Alternatively a single length of cable can be used to extend completely around the structure. With this arrangement one end of the cable is fixed at one anchor point and then led alternatively around the building and ground anchors completely around the building and secured and tightened upon its return to the first anchor point. This alternative will ensure that each supporting cable section will be of uniform tension.

The tightening device used need not of course be exactly as shown and any number of known cable tensioning devices such as fence-tighteners, block-and-tackle, etc. can also successfully be used.

To assist in positioning the cable around the plates positioned on the building, a pole (not shown) having a hook or loop to lift the cable into position may be used to advantage to make the use of a ladder unnecessary.

In FIGURE 1 of the drawings the building is shown without doors or windows but this omission is simply for purposes of clarity in the drawings.

When there is a door in the building the cable can pass from one house anchor to the next directly above the door so as not to block the entrance or have a ground anchor in an inconvenient position.

It is suggested that the ground anchors be positioned a distance away from the structure to provide a support angle of about 45°, but this of course is not completely necessary.

All the necessary hardware can be sold as a do-it-yourself kit. The hooks and plates and ground anchors are made permanent fixtures with all other equipment being fitted when there is danger of tornadoes or flooding, and removed and stored away when the danger period is over.

While the invention has been described mainly for securing the structure from the outside, it is to be understood that a similar method of using single cables passed over step plates or pulleys can be employed totally within the structure or be employed in addition to the anchoring means without the structure.

In FIG. 7 there is shown in outline only means for anchoring the structure from within. Slip plates or pulleys **40** are mounted at suitable locations under the roof of the building and suitable anchoring means **42** are secured, preferably under the level of the floor of the structure, either in individual pockets **44** or in a slotted structure extending the full length of the building. The cable securing means **46** is the same as that above described for securing the outside of the structure. In FIG. 7 the separate cables **46*a***, **46*b*** and **46*c*** are laid over the slip plates or pulleys **40** in the longitudinal direction of the structure and are provided with a single tensioning means **48** in the manner previously described.

I claim:

1. Anchorage apparatus for securing and strengthening a building structure during extreme conditions, such as high winds and flooding, said building having a roof, gable end walls, and a floor, said apparatus comprising a plurality of first anchor means permanently secured at spaced apart intervals around the building structure at locations beneath the roof and on the gable end walls of the

building, a plurality of second anchor means set in the floor and centrally located within and longitudinally of the building, cable means removably positioned around said first and second anchor means, and means to tighten the said cable means about said first and second anchor means.

2. Anchor apparatus as set forth in claim 1 in which the said second anchor means are set in pockets in the floor of the building under the level of the said floor.

3. Anchoring apparatus according to claim 1 wherein the uppermost ends of the said second anchor means are provided as hooks to removably engage a slip plate around which the cable is positioned.

4. Anchoring apparatus according to claim 1 wherein the anchor means secured to the building structure are slip plates provided with grooves to receive the cable means.

5. Anchoring apparatus according to claim 1 wherein the anchor means secured to the structure are plates provided with hooks to removably engage a slip plate around which the cable is positioned.

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52—23, 166; 135—15