

Feb. 27, 1962

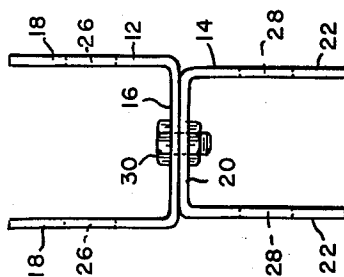
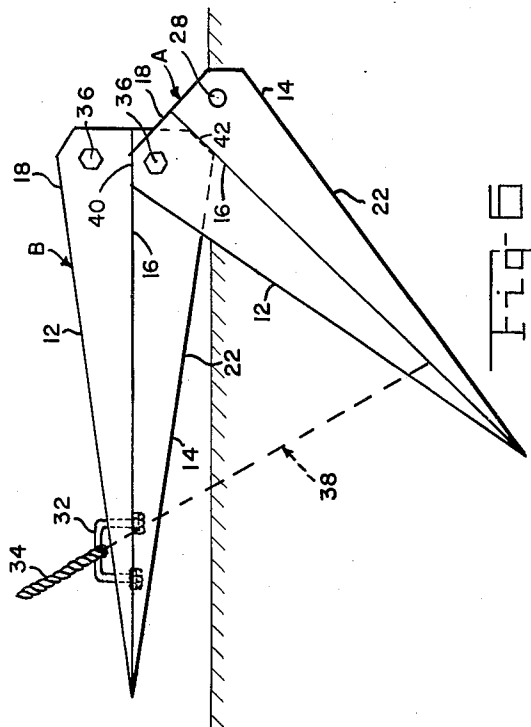
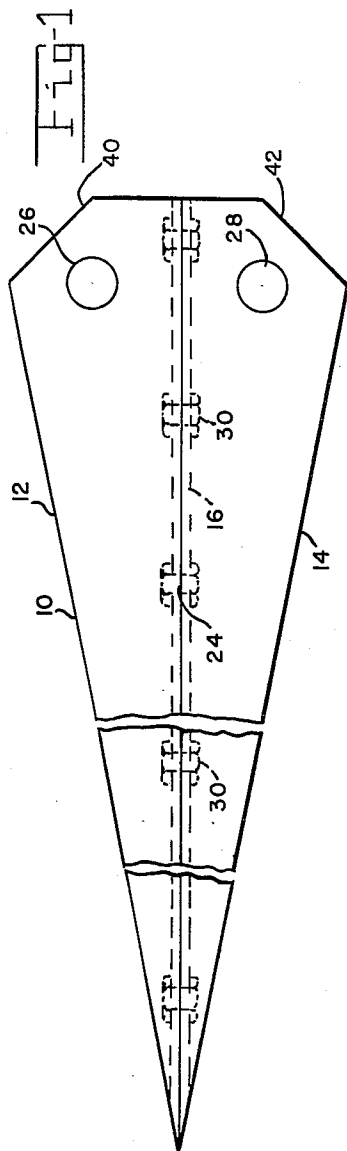
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3,022,873

LIGHTWEIGHT RECOVERABLE GUY ANCHOR

Filed June 15, 1959

2 Sheets-Sheet 1



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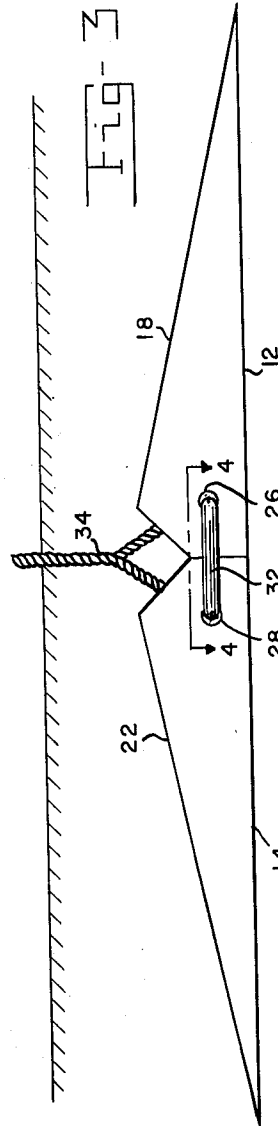
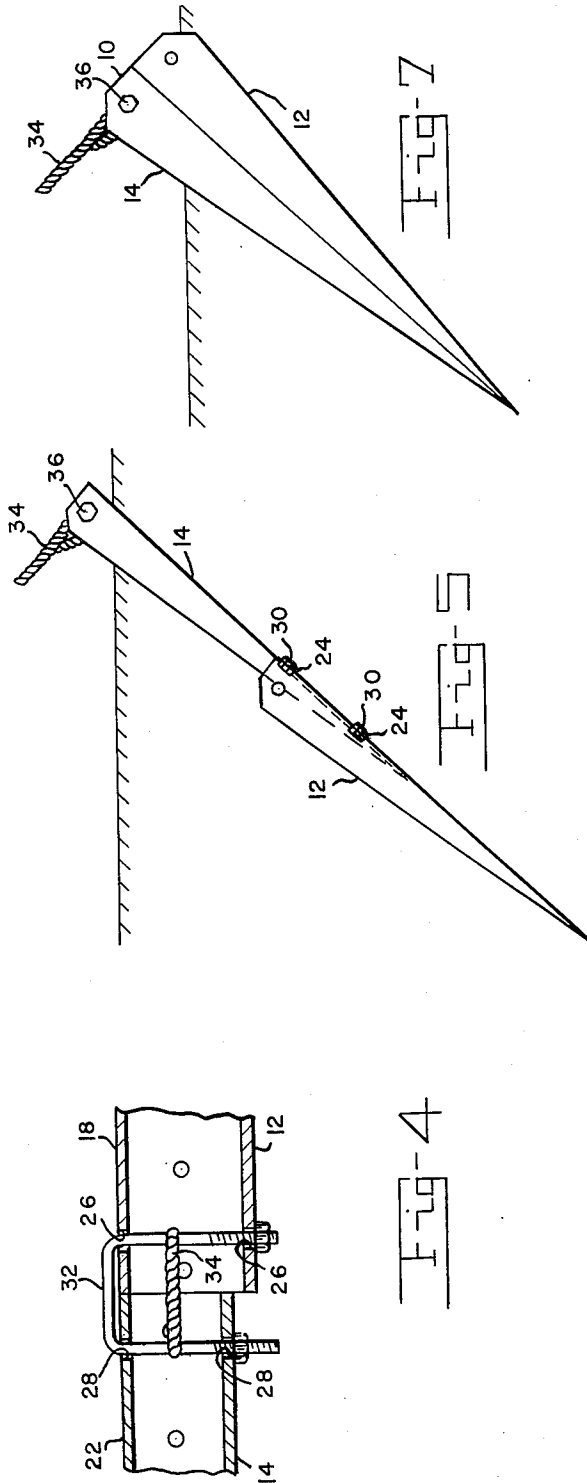
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LIGHTWEIGHT RECOVERABLE GUY ANCHOR

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4 Claims. (Cl. 189-90)

(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the United States Government for governmental purposes without payment to me of any royalty thereon.

This invention relates to a new lightweight recoverable guy anchor that can be driven without special tools into all types of soil and ice, and that can be withdrawn from the earth with a minimum of effort.

The anchor of the present invention consists of a unit form that can be arranged in various ways to suit the soil and load conditions and can be used for anchoring guys for towers, masts, radomes, shelters, tents and other temporary and permanent structures.

At present anchors that are used in rocky soil are not as efficient for loose sandy soils and vice versa. An anchor with minimum projected surface area such as a circular rod can be driven easily into rocky soil by a sledge hammer, but has little holding power when driven into sandy soil due to the superior bearing characteristics of rocky soil when compared to loose sand. To get good holding power characteristics in loose sand, it is necessary to increase the bearing area which can only be accomplished by increasing the projected area of the anchor. The reverse is true when it is necessary to drive a good sand anchor into rocky soil since it is difficult to get the anchor to penetrate the soil fully and the possibility of the anchor bending under constant hammering is great.

An object of the present invention is to provide an anchor which by proper manipulation of the basic tapered channels can result in an anchor suitable for use in all types of soils, rocky to sandy.

According to the present invention the anchor comprises at least two tapered U channels having different widths and means to secure said U channels together to form a single unit.

These and other objects and features of the present invention are described below in connection with the accompanying drawings.

In the drawings FIG. 1 is a view of two U channels secured together in one embodiment of the present invention.

FIG. 2 is an end view of the embodiment shown in FIG. 1.

FIG. 3 is a view of two U channels secured together in another embodiment of the present invention and placed in operative engagement with the earth.

FIG. 4 is a sectional view of one embodiment of the present invention taken along the line 4-4 of FIG. 3.

FIG. 5 is a view of two U channels secured together in still another embodiment of the present invention also in operative engagement with the earth.

FIG. 6 is a view of still another embodiment of the present invention wherein four U channels are employed.

FIG. 7 illustrates the embodiment of the present invention shown in FIGS. 1 and 2 in operational engagement with the earth.

Referring now in detail to the drawings wherein like numerals designate like parts and more particularly to FIG. 1 there is shown an embodiment of the present invention generally designated 10 comprising a larger tapered U channel 12 and a smaller tapered U channel 14.

Said tapered U channel 12 is formed with a base portion 16 and two parallel tapered upright portions or mem-

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bers 18. The smaller tapered U channel 14 is formed by a base portion 20 and two parallel tapered upright portions or members 22. The singular difference between the tapered U channel 12 and the tapered U channel 14 is the width of their respective base portions, said difference being that the outside width of the base 20 of the tapered U channel 14 is smaller than the inside width of the base 16 of the tapered U channel 12. Both the tapered U channels 12 and 14 have a series of holes 24 equidistantly spaced along the center line of their respective base portions 16 and 20.

The larger tapered U channel 12 has a hole 26 in each of its parallel tapered upright portions or members 18, adjacent the truncated portion 40. The center of said hole is located at a point equidistant from the base 16 and the outer edge of the upright portion 18 along a line perpendicular to the plane of the base portion 16 and through the point on the outer edge of the upright 18 lying the greatest distance from the base portion 16. Accordingly, the holes 26 in each of the tapered upright portions 18 will be disposed directly opposite each other.

Each of the tapered upright portions 22 of the smaller tapered U channel 14 has a hole 28 adjacent the truncated portion 42 and equal in size to the holes 26 in the tapered U channels. The holes 28 are located in the tapered upright portions 22 in the same manner as described above for the location of the holes 26 in the tapered upright portions 18.

In operation, one embodiment of the present invention, (FIGS. 1 and 2) to be used when soil condition is medium hard to hard and a load must be sustained of a magnitude likely to bend a single U channel, a larger tapered U channel 12 is bolted base to base with a smaller tapered U channel 14 by means of a number of nuts and bolts 30 placed through the holes 24 along each of the respective bases 16 and 20. After thus being operatively joined together the single unit 10 is driven into the ground (FIG. 7) by means of a sledge hammer or other driving implement and the guy wire or rope is attached. The guy may be attached to the anchor in any of several obvious manners, the preferred method, however, is by merely placing an ordinary bolt 36 through the holes 28 in the smaller tapered U channel 14. The anchor can, if desired, be withdrawn by pulling in the opposite direction from that which it was driven.

Another embodiment of the present invention to be used in sandy or swampy ground is disclosed in FIG. 5 which shows a smaller tapered U channel 14 nested "piggy back" on a larger tapered U channel 12. In this embodiment two sets of nuts and bolts 30 are employed to secure the two tapered U channels together. The nose or pointed end of the smaller tapered U channel 14 is inserted into the top portion of the larger tapered U channel 12 to the extent that the two holes 24 nearest the nose of the smaller U channel are aligned with the two holes 24 nearest the top of the larger U channel and the two U channels are then secured together by means of two sets of bolts and nuts 30. Additional tapered U channels may be added by alternating smaller and larger tapered U channels depending on how sandy or swampy the ground is. Thus, depending on loading power desired each additional anchor would increase the anchor area. The guy wire or rope would be attached in the same manner as described above relative to the embodiment shown in FIG. 7. Withdrawal of the anchor is also accomplished as previously described.

Still another embodiment is shown in FIGS. 3 and 4. This embodiment is known as a "dead man" anchor and is formed by placing a tapered U channel 12 and a tapered U channel 14 end to end and placing a U bolt 32 through the holes 26 in the uprights 18 and the holes

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28 in the uprights 22. The U bolt nuts are then tightened and the guy wire 34 attached to the U bolt 32. The entire anchor is then buried in sand or earth creating the "dead man." Removal of this anchor can only be accomplished by digging it up.

FIG. 6 shows still another embodiment of the present invention and can be used when soil conditions are medium hard to hard and a larger load than that which can be sustained by the simple anchor of FIG. 7 is required. In this embodiment two separate units are formed as shown and described relative to FIGS. 1 and 2. Unit A is driven into the ground at an angle of approximately 45° as shown in FIG. 7 with the larger tapered U channel 12 facing upward. The smaller tapered U channel 14 of unit B is then slipped into the tapered U channel 12 of unit A aligning the holes 28 in the tapered U channel 14 of unit B with the holes 26 in the tapered U channel 12 of unit A. In this manner, the truncated portion 42 of unit B bears against the inside surface of portion 16 of unit A, and the truncated portion 40 of unit A bears against the outside surface of base portion 16 of unit B, thereby fixing the angular relationship between unit A and unit B. One leg of a U bolt 36 is then placed through the aligned holes and the other leg is placed through the holes 26 in the tapered U channel 12 of unit B and both legs are tightly secured with their respective nuts. The two bolts and nuts 30 in the two holes 24 nearest the tapered end of unit B are then removed and are replaced by a second U bolt 32 to which the guy wire is attached. This embodiment (FIG. 6) will permit greater loads to be sustained by the anchor due to the moment of rotation caused by pulling upwardly along the line of action 38, thereby rotating unit A in a clockwise direction to cause it to become more firmly entrenched in the ground.

The present invention has been described in detail above for the purpose of illustration only and is not intended to be limited by this description or otherwise except as defined in the appended claims.

I claim:

1. A recoverable guy anchor of the type described comprising a first tapered U channel and a second tapered U channel, said tapered U channels having a top portion and a nose portion, the external width of said first tapered U channel being smaller than the internal width of said second tapered U channel, said U channels having a series of equidistantly spaced holes along the centerline of the bases of each of said U channels, and means for securing the nose portion of said first tapered U channel within the top portion of said second tapered U channel to form a single unit capable of being driven into the earth.

2. A recoverable guy anchor of the type described

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comprising a first and a second pair of tapered U channels, each of said pairs of tapered U channels including a large tapered U channel and a small tapered U channel, each of said tapered U channels having a base portion and two parallel tapered upright members, a series of equidistantly spaced holes disposed along the centerline of the base of each tapered U channel, each said upright member having an opening positioned adjacent the widest portion thereof, means operatively associated with said series of holes to secure the smaller tapered U channels of each pair of tapered U channels to its respective larger tapered U channel, and means in cooperation with said opening in each upright member operatively associating the larger tapered U channel of said first pair of tapered U channels with the smaller tapered U channel of said second pair of tapered U channels to form a unit guy anchor, capable of being driven into the earth.

3. A recoverable guy anchor comprising a pair of tapered U channels each adapted to be arranged in interchangeable relation one to the other; each of said U channels having a flat base portion and a pair of integrally mounted, generally triangular, parallel, upstanding side members; one of said U channels having a wider base portion than the other U channel; said U channels being adapted to be connected together in adjustable, longitudinal, base-to-base relation for forming a unit anchor capable of being driven into the ground.

4. A recoverable guy anchor comprising a plurality of basic anchor units arranged in interlocking association; each of said basic anchor units consisting of a pair of tapered U channels fastened in fixed base-to-base relation; each of said U channels having a flat base portion and a pair of integrally mounted, generally triangular, parallel, upstanding side members; the base portion of one of said U channels in each pair being wider than the base portion of the other of said U channels; said U channel having a wider base portion being interlocked with a U channel having a smaller base portion in another basic anchor unit; said side members having a truncated portion disposed opposite the corresponding base portion thereof bearing against the base portion of another basic anchor unit; and means operatively associated with said side members for maintaining said interlocking relationship when the guy anchor is subjected to a load.

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