

Nov. 17, 1964

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3,157,256

ICE ANCHOR

Filed Aug. 25, 1961

FIG. 1.

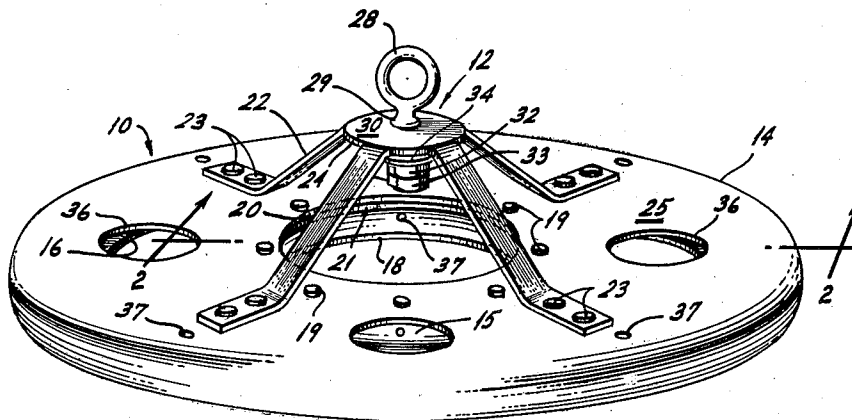


FIG. 2.

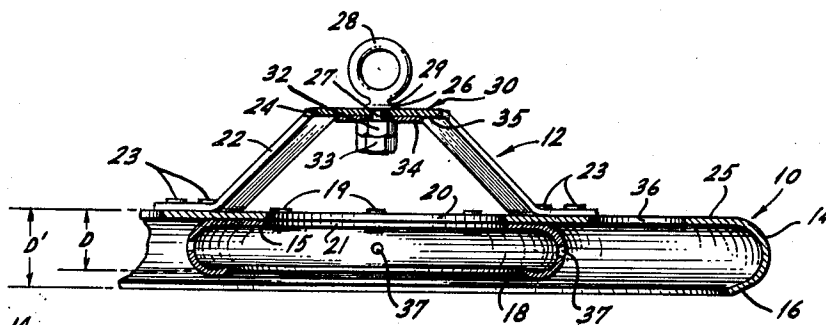
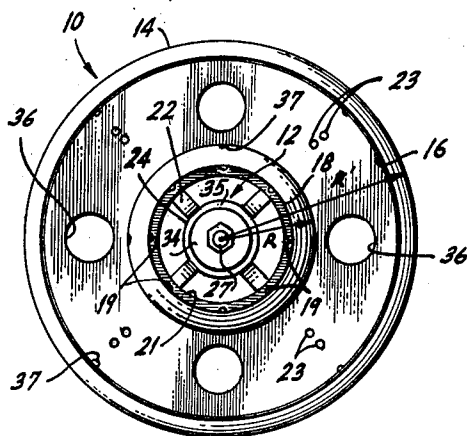


FIG. 3.

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Filed Aug. 25, 1961, Ser. No. 133,965

7 Claims. (Cl. 189—90)

The present invention relates to securing means, and more particularly to a new and novel device for securing a guy cable or similar staying connection in ice or frozen terrain.

The installation of lofty structures such as antenna towers in sub-freezing locations have met with serious complications due to difficulties and problems which arise in tying guy connections to ice or frozen ground. The problem and difficulties are especially acute in regions, such as the Arctic or Antarctic, where long periods of extreme cold temperatures maintain the ice and ground in deeply and solidly frozen conditions.

It is therefore an object of the present invention to overcome and to solve the difficulties and problems referred to above by providing a device constituting an ice anchor adapted to secure a guy cable or the like for staying an upright structure and to become so firmly and rigidly embedded in ice as to withstand stresses and strains normally imposed on such a device by the guyed structure.

It is also an object of the invention to provide a device of the kind mentioned above which, while characterized by the simplicity of its construction, possesses unique means which promotes positive and rigid attachment to a frozen surface, minimizing dislodgement under loads transmitted from the erected structure to the device through the guy connection.

Other and more specific objects and characteristic features of the invention have to do with the provision of an ice anchor which can be produced economically, which is compact and capable of being handled conveniently for easy placement in operative position, and which is highly effective and reliable in use.

Toward achievement of these objects and features, the invention in its preferred embodiment employs a plurality of simple plate members constructed and arranged to constitute a rugged unit having means for effecting mounting of the unit with increased holdability in solid ice. Specifically, the plate members incorporated in the device of the invention are interconnected rigidly at areas spaced inwardly from their marginal edges, and each plate member is so configured as to provide its marginal edge portion with an inwardly directed hooking ledge or shelf adapted to lie and to extend in a solid ice mass to anchor said device to said ice mass.

The nature of the invention, and the above as well as other objects and features thereof, will be understood more fully from the following description based on the accompanying drawing in which:

FIGURE 1 is a perspective view illustrating a preferred form of ice anchor embodying the principles of the present invention;

FIGURE 2 is a horizontal cross-sectional view of the device illustrated in FIGURE 1, looking in the direction represented by arrows 2—2 in said FIGURE 1; and

FIGURE 3 is a bottom plan view, on a reduced scale, of the device illustrated in FIGURES 1 and 2.

Having more particular reference to the drawing, the illustrated ice anchor consists of an ice-engaging section 10 and a guy-securing section 12.

The ice-engaging section 10 comprises a base assembly constituted by an outer member 14 and an inner member 15. These members are constructed of rigid metal plates, such as steel disks, and are, respectively, provided with

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downwardly rounded marginal portions 16 and 18 so that each of said members has the general form of an inverted pan with inturned edges. As shown, inner pan member 15 is nested completely within the confines of the outer pan member 14 and, for that purpose as is indicated in FIGURES 2 and 3, the depth D and radius R of said inner member are less than the depth D' and the radius R' of said outer member.

The inner and smaller pan member 15 is disposed concentrically with respect to the outer and larger pan member 14, and these members are rigidly interconnected by means of suitable fastening elements, such as rivets 19, which pass transversely through said members. These fastening elements or rivets are arranged adjacent to and about registering openings 20 and 21 formed in the interconnected disk members 14 and 15, respectively, said openings being disposed in the central portion of said disk members.

The guy-securing section 12 includes a spider bracket 22 which is rigidly attached as by means of rivets 23 to the inverted pan-shaped outer member 14, and which has a raised platform 24 disposed above the top surface 25 of said outer member and located generally to coincide with the registering central openings 20 and 21 in said member. The platform 24 has an axially located aperture 26 to receive the shank 27 of a guy-attaching eye-bolt 28, the latter being provided with a flaring flange 29 abutting the upper surface 30 of said platform. The eye-bolt 28 is secured to the platform 24 by means of a tightening nut 32 and a locking nut 33 on the eye-bolt shank 27, a metal washer 34 being interposed between said locking nut and the underside 35 of said platform to insure proper retention of said bolt thereon.

The above described anchor when used in regions where sub-freezing temperatures prevail, can be secured with extreme rigidity to solidly frozen ice or snow by placing the device upon a levelled surface of the ice or snow and filling the inverted pan members 14—15 with water poured through the registering central openings 20 and 21 thereof. This water freezes and integrates with said ice or snow to provide a solid bond between the anchor and surface upon which it rests. The anchor can also be secured by submerging it in a shallow pool of water created by melting an area of frozen surface. When this pool of water refreezes within and about the anchor, there is established a firm connection between said anchor and the supporting frozen surface.

As seen in the drawing, series of venting holes 36 and perforations 37 are provided in the inverted pan members 14 and 15. As more clearly seen in FIGURE 3, the venting holes 36 and perforations 37 are arranged in circles which are concentric with the registering openings 20 and 21. These venting holes and perforations insure proper distribution and freezing of the water throughout said members so as to permit the escape of air from the interior of said members as the water fills the same and as the ice forms therein. It will be appreciated that once the water has frozen solidly within the concentric members 14 and 15, the inturned edge portions 16 and 18 thereof become securely embedded in and firmly grip the frozen ice mass, thus rigidly securing the anchor to the ice surface. In operation, the inner and smaller pan member 15 reinforces the central area of the outer and larger pan member 14, and said inner member cooperates with said outer member to resist load stresses applied to the anchor when a guy cable or similar staying means is attached to the eye-bolt 28.

If desired, an anchor installed in one location can readily be removed from that location and reinstalled in another location. For that purpose it is only necessary to melt the ice, for instance by means of a blow torch, so

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as to free the anchor for reinstallation as previously described.

Although a preferred embodiment has been shown and described, it will be appreciated that the invention is not limited to specific structures of this embodiment but embraces such changes and variations as come within the scope of the subjoined claims.

What I claim is:

1. An ice-anchor comprising a first disk of rigid metal having a predetermined diameter and provided with an inturned marginal edge portion to define a larger pan-shaped member, a second disk of rigid metal having a diameter less than said first disk and provided with an inturned marginal edge portion to define a smaller pan-shaped member, and means fixedly interconnecting said disks concentrically with respect to each other, said smaller pan-shaped member being nested within the confines of said larger pan-shaped member.

2. An ice-anchor comprising a first disk of rigid metal having a predetermined diameter and provided with an inturned marginal edge portion to define a larger pan-shaped member, a second disk of rigid metal having a diameter less than said first disk and provided with an inturned marginal edge portion to define a smaller pan-shaped member, means fixedly interconnecting said disks concentrically with respect to each other, said smaller pan-shaped member being nested within the confines of said larger pan-shaped member, and guy-attaching means affixed upon the outer side of said larger pan-shaped member.

3. An ice-anchor as set forth in claim 2, in which the last mentioned means coincides with the central transverse axis of said disks.

4. An ice-anchor as set forth in claim 2, in which the

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mentioned pan-shaped members have an open area providing a passage into said members for filling the same with water.

5. An ice-anchor as set forth in claim 2, in which the mentioned pan-shaped members have an open area providing a passage into said members for filling the same with water, said passage being disposed centrally of said members, and in which said members have venting holes and perforations to provide for the escape of air as water fills the mentioned inverted pan structure, said holes and perforations being arranged in circles concentric with said open area.

6. An ice-anchor comprising a generally flat outer element of rigid metal, a generally flat inner element of rigid metal, means fixedly interconnecting said elements in superimposed generally parallel relation and with marginal regions of the outer element extending beyond marginal regions of the inner element, and inturned edge portions at said marginal regions to provide each element with downwardly and inwardly projected ice-gripping means directed to engage an underlying ice surface, the inner element with its gripping means being nested within the confines of the outer element with its gripping means.

7. An ice-anchor as set forth in claim 6, in which guy-attaching means is affixed upon the outer side of the mentioned outer element.

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