United States Patent [19]

Fukuda

[11] **3,734,443**

[45] **May 22, 1973**

[54] **ANCHORING MECHANISM FOR FLEXIBLE SHEET STRUCTURES**

[76] Inventor: **Ernest T. Fukuda,** 2040 W. 30th St., Los Angeles, Calif. 90018

[22] Filed: **Apr. 1, 1971**

[21] Appl. No.: **130,203**

[52] **U.S. Cl.** ..... **248/361 R**

[51] **Int. Cl.** **E04b 1/56**

[58] **Field of Search** ..... 248/361 R, 361 B, 248/361 A; 24/125 R, 135 R, 135 CT, 165 R, 265 EC; 52/295, 698, 2; 61/30; 285/260, 253

[56] **References Cited**

UNITED STATES PATENTS

295,109	3/1884	Bulcroft	285/253
3,355,851	12/1967	Imbertson et al.	52/698
1,730,197	10/1929	Elsey	24/135 R
94,011	8/1869	Lemon	248/361
2,567,743	9/1951	Stafford et al.	160/380

FOREIGN PATENTS OR APPLICATIONS

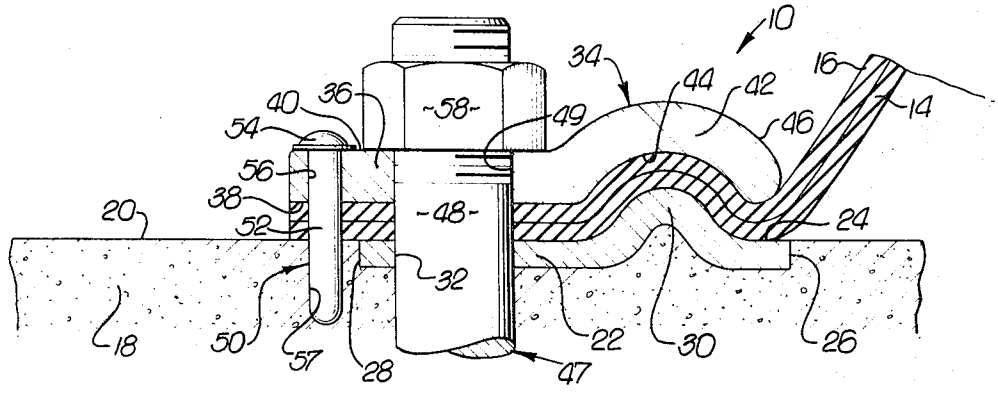
473,636	3/1929	Germany	248/361 B

Primary Examiner—Edward C. Allen
Attorney—Huebner & Worrel

[57] **ABSTRACT**

A device for anchoring flexible sheet structures on a solid mass including a plate member mounted in the mass with its opposite end regions representing exposed surfaces coplanar with the mass and said plate having an intermediate section with a configuration offset from the plane of said surfaces all presenting an upper surface. A clamp adapted to be located from said plate and having an engagement surface coinciding with the profile of the upper surface of the plate and anchor means extending from said mass through said plate and said clamp adapted to retain flexible sheet structures between said plate and said clamp.

3 Claims, 5 Drawing Figures



PATENTED MAY 22 1973

3,734,443

FIG. 1.

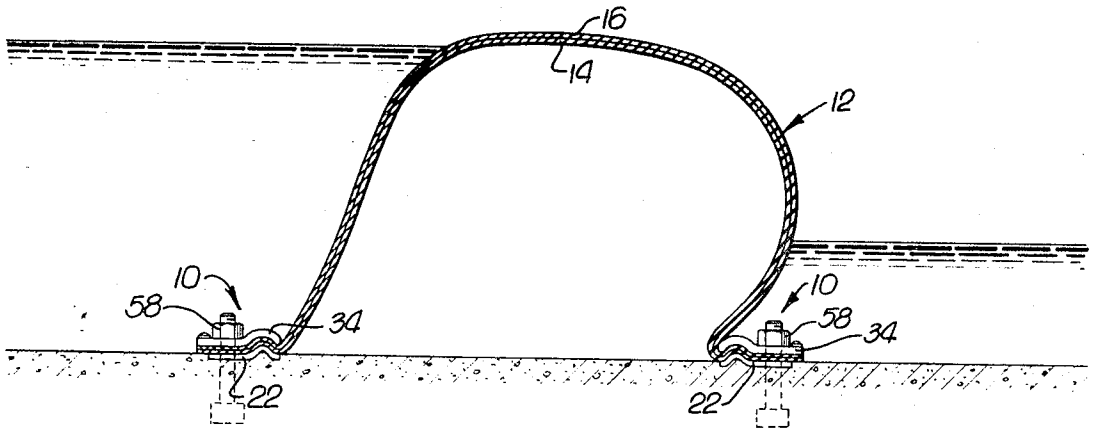


FIG. 2.

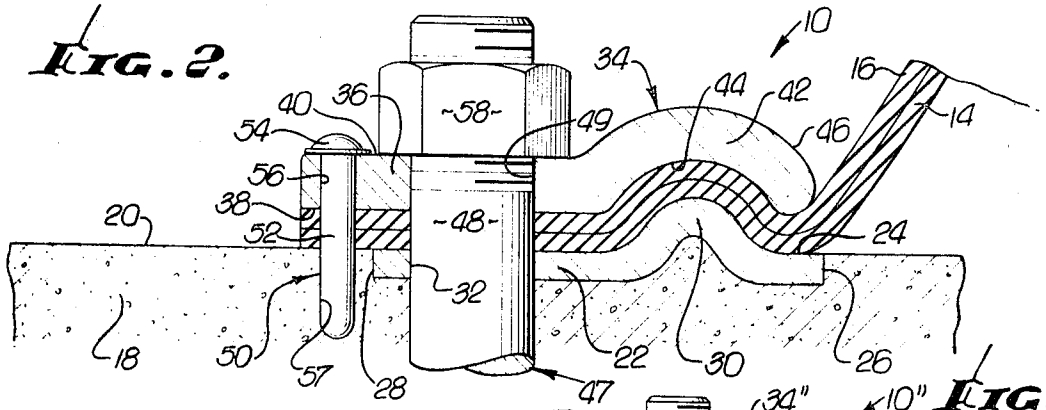


FIG. 5.

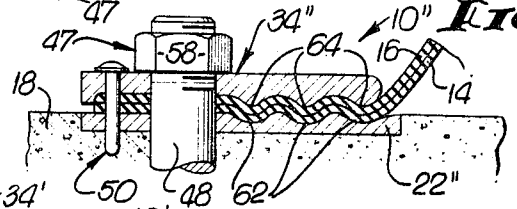
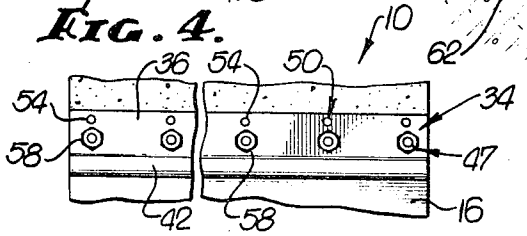


FIG. 3.

FIG. 4.



INVENTOR.
ERNEST T. FUKUDA
BY Huebner & Worrel
ATTORNEYS.

ANCHORING MECHANISM FOR FLEXIBLE SHEET STRUCTURES

BACKGROUND OF THE INVENTION

The field of this invention lies in anchor means for clamping covers on such structures as oil tanks, water tanks, reservoirs or for retaining collapsible flexible sheet material dams in a fixed location.

Heretofore, when pressure has been exerted against certain cover members or collapsible dams, the clamp members utilized to retain said covers or dams in position have had a tendency to give way causing the covers or dams to become dislodged.

SUMMARY OF THE INVENTION

In the present invention it is an object to provide an anchoring mechanism which is adapted to interrupt a flat planar surface of the member to be gripped in the area to be clamped whereby pressure can be exerted in the area of the interruption to cause an anchoring or fastening of the member in position.

Another object of the invention is to provide a plate which is seated in a solid mass wherein a portion of the plate is offset from the planar surface of the mass and a clamp is provided having a surface coinciding with the profile of the plate member and anchor means are provided which will urge the clamp against the material positioned between the clamp and the plate, and retain said material therebetween.

A further boject of the invention is to provide a locating pin which will orient openings through the plate, structure to be anchored and clamp so that the entire assembly may be positioned on the anchor means.

These and other objects and advantages will become apparent from the following description and drawings, wherein:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a cross sectional environmental view of one form of anchoring mechanism as it would be applied to anchor a flexible, collapsible dam to the bed of a canal, river, etc.;

FIG. 2 is an enlarged cross sectional view of the form of anchoring mechanism as illustrated in FIG. 1;

FIG. 3 is an enlarged cross sectional view of a modified form of anchoring mechanism;

FIG. 4 is a top plan view of a section of the anchoring mechanism illustrated in FIGS. 1 and 2; and

FIG. 5 is a cross sectional view of a second modified anchoring mechanism.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

While the anchoring mechanism generally designated 10 illustrated in FIGS. 1 and 2 is shown as applied to a flexible collapsible dam 12, it should be noted that the anchoring mechanism 10 can be adapted for use for clamping down or holding various structures such as oil tank covers, water tank covers and/or reservoir covers.

In the principal application illustrated, the flexible collapsible dam 12, while not comprising a part of this invention, includes inner and outer elongated sheets 14 and 16 of flexible material such as rubber, rubber impregnated plastic, etc. In order to maintain the collapsible dam 12 in position on a mass or bottom 18 having a surface 20, of a river or canal, anchoring mechanisms 10 are utilized to extend across surface 20 of the bottom 18 in longitudinal spaced apart relationship as shown in FIG. 1.

While the anchroing mechanism 10 may be of short sections in transverse aligned relationships, it is preferable that it be a continuous member extending the entire width of the material to be retained to assure proper anchoring thereof. In FIG. 4 there is illustrated an elongated anchoring mechanism 10.

The bottom 18 is generally a solid mass such as concrete, macadam or other solid structure.

The anchoring mechanism 10 includes a rigid plate 22 preferably of steel which is mounted in the bottom 18 so that the top surface 24 of the plate 22 is flush with the surface 20 of the mass 18. In the embodiment illustrated in FIGS. 1 and 2, the rigid plate 22 intermediate opposed ends 26 and 28 is formed with an upwardly projecting transverse rib 30 which extends the entire length of the plate 22. In the embodiment shown in FIG. 2, the plate 22 is bent to form the upwardly projecting rib 30. However, it should be noted that any type of an upward transverse projection formed on the top surface 24 of the rigid plate 22 can be used to form an offset in the planar surface 24 without departing from the spirit of the invention.

The projecting rib 30 is preferably rounded in cross section so as not to cut into the material to be maintained thereon and cause it to tear or become damaged. Adjacent the end 28 of the plate 22 is a bore 32 which extends through the plate.

As a part of the anchoring mechanism 10 there is also provided a clamp member 34 adapted to be positioned over the rigid plate 22. The clamp member is of the same dimensional length as the plate 22 and includes a generally flat body portion 36 having opposed inner and outer generally parallel surfaces 38 and 40. Extending from the body portion 36 of the clamp member 34 is a generally hook-shaped clamping head 42, which in FIG. 2, includes a concave inner surface 44 and convex outer surface 46 joining surfaces 38 and 40, respectively. The concave inner surface 44 has a cross sectional profile coinciding with the profile of the upwardly projecting rib 30. Extending through the flat body portion 36 of the clamp member 34 is a bore 48 adapted to be aligned with the bore 32 in the rigid plate member 22.

Mounted in the bottom solid mass 18 is an anchor means 47 including an anchor bolt 48 which extends upwardly above the surface 20 and is adapted to pass through the bore 32 and bore 49 as well as the flexible inner and outer sheet members 14 and 16 such as viewed in FIG. 2. Appropriate openings may also be formed in the sheet material 14 and 16 so that they are aligned between the respective bores 32 and 49, when positioned between the plate 22 and clamp member 34.

In order to appropriately align the sheet material 14 and 16 and clamp 34 from the plate 22, there is provided an orientation means 50 in the form of a pin 52 having a head 54, which pin 52 is adapted to be inserted through a bore 56 in the flat body portion 36 of clamp member 34 and through appropriate openings in the sheet material 14 and 16 into a preformed bore 57 in the bottom or mass 18.

When the pin 52 has been appropriately inserted through the bore 56 and through the sheet material 14 and 16 so that the head 54 rests upon the surface 40 of the flat body portion 36, the entire mechanism is properly aligned with the sheet material extending between

the plate member 22 and the clamp 34. A nut 58 may be threaded onto the bolt 48 so that the clamp 34 will be moved downwardly toward the plate 22 causing the sheet material 14 and 16 therebetween to be anchored along the entire width of the anchoring mechanism 10. Such anchoring will disrupt the flat planar surface of the sheet material and increased retention is achieved.

While only one anchor means 48 and orientation means 52 have been described, it should be apparent from FIG. 4 that a plurality of these bolts may be spaced along the entire length of the anchor mechanism 10 to maintain the flexible sheet structure along its entire width.

In FIG. 3 there is illustrated a modified form of anchor mechanism 10' wherein the plate 22' instead of having an upwardly projecting rib, includes a transversely extending downwardly projecting groove 60 which is preferably rounded so as to prevent damage to the structure maintained therein and the groove 60 is intermediate the respective opposed ends 26' and 28' so that the configuration of the plate 22' is offset from the upper plane 24' of the plate 22'. While the plate 22' is bent to achieve the groove 60, any means may be utilized to form said groove, such as by cutting or grinding.

When a plate structure, such as illustrated in FIG. 3 is utilized, the clamp member 34 includes, projecting from the flat body portion 36', a downwardly depending bulbous generally hook-shaped clamping head 42' having an inner surface 62 conforming to the rounded configuration of the groove 60. The anchor means 47' and orientation means 50' are the same as previously described. Thus, when the inner and outer sheet material 14 and 16 are positioned on the plate 22' they will be depressed into the groove 60 by the hook-shaped bulbous clamping head 42' as the nut 58 is drawn down upon the clamp 34, and clamping will occur along the entire width of the plate 22' and the clamp 34'.

FIG. 5 illustrates a second modification of the anchoring mechanism 10''. In this configuration, the plate 22'' includes a plurality of elongated parallel corrugations 62 and the clamp member 34'' includes a plurality of corresponding elongated parallel corrugations 64 transversely formed to mate with the corrugations 60''.

When the inner and outer sheets 14 and 16 are placed between the plate 22'' and the clamp 34'' they will be depressed and conform to the corrugations and additional interruptions of the planar surface of the section of material retained is achieved to assure proper retention.

Although I have herein shown and described my invention in what I have conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of my invention.

I claim:

1. The combination of a flexible compressible sheet material and means anchoring the same in fluid tight relationship on a formed solid surface mass comprising:

a rigid plate with generally flat end sections mounted in the mass with its opposite ends presenting exposed upper surfaces co-planar with the first mentioned surface, and an intermediate section with a configuration vertically offset from the plane of said surfaces, said intermediate section presenting an upper surface in the form of an arcuate segment;

a post rigidly secured in the mass and extending vertically through one of the flat end sections;

a clamp having a lower engagement surface generally coinciding with the profile of the upper surface of the plate including a generally flat end section corresponding to the end section of the plate where the post is located, and an opposite end section presenting a vertically offset lower surface in the form of an arcuate segment generally concentric with the arcuate segment of the plate; the sheet material being disposed on the upper surface of the plate on the end section through which the post extends and on the upper surface of the intermediate section, the post extending through the sheet material; and

means associated with said post to tighten down on said clamp whereby said flexible material will be distorted to the profile of said upper surface of the intermediate section of said rigid plate and said arcuate surface of said clamp and clamped with uniform compression between the arcuate segments and between the flat surfaces of the plate and clamp through which the post extends.

2. A combination as defined in claim 1 wherein the arcuate segment of the intermediate section of the rigid plate projects vertically above the exposed upper surfaces, and the arcuate segment of the clamp is concave.

3. A combination as defined in claim 1 wherein the arcuate segment of the intermediate section of the rigid plate projects vertically below the exposed upper surfaces, and the arcuate segment of the clamp is convex.

* * * * *