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(54) **Anchor with means for securing to sea bed and for facilitating retrieval**

(57) An anchor with means for securing to the sea bed or ground comprising a narrow portion (1) and a widened portion (2) connected thereto, wherein the anchor is provided with at least one liquid channel (4), which has

a connection for a liquid supply line (5) at one end and which has at least one outlet opening (7) at the other end, which outlet opening (7) is present in the outer surface of the widened portion (2).

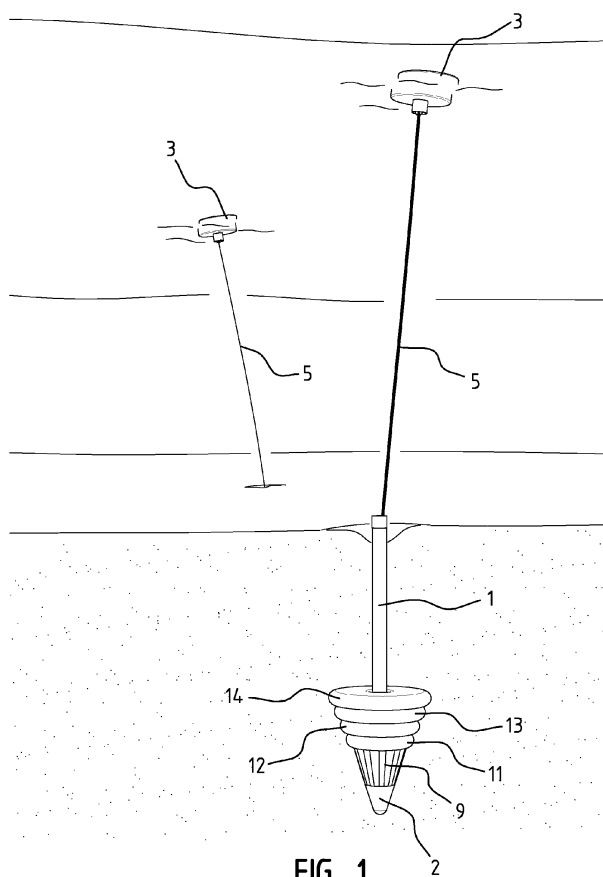


FIG. 1

Description

[0001] The present invention relates to an anchor comprising a narrow portion and a widened portion connected thereto. Such anchors are known, for example in the form of a mushroom anchor. A mushroom anchor is a stock anchor, with a heavy spherical segment attached to the end thereof. The anchor is used as a permanent anchor, for example in clay or fine sand bottoms. The semi-spherical segment sinks slowly into the seabed, whilst the shank remains largely above the seabed.

[0002] The object of the invention is to provide an improved permanent anchor which is capable of providing a large axial and radial holding force, which is easy to install, quickly ready for use, easy to remove and/or suitable for several bottom types.

[0003] According to the invention, the anchor is provided with at least one liquid channel, which has a connection for a liquid supply line at one end and which has at least one outlet opening at the other end, which outlet opening is present in the outer surface of the widened portion. By squirting water through the liquid channel with great force, the seabed is loosened and becomes watery, as a result of which the anchor sinks deeply, preferably entirely, into the bottom. By using this injection technique, a hole is formed, so that subsequent deepening of the anchorage becomes possible. Using the same technique, the anchor can be easily removed again. Since the widened portion of the anchor is deeply sunk into the bottom, the anchor will less easily break free as a result of thixotropy of the upper soil stratum.

[0004] In the preferred embodiment, the narrow portion is made up substantially of a shank, which is preferably hollow or filled with a mass which is heavier than water, for example concrete.

[0005] The liquid channel preferably extends through the hollow or filled shank in that case. Furthermore, the liquid channel preferably extends from the anchor in a flexible hose, such that said hose can extend toward and above the water surface upon installation of the anchor, where it can be attached to a buoy. The hose is preferably capable of withstanding high pressures. When the installation is complete, the hose can preferably be disconnected near the upper side of the shank.

[0006] The widened portion is preferably substantially conical in shape, with the point of the cone pointing away from the narrow portion.

[0007] The liquid channel is preferably split, with several outlet openings being present in the outer surface of the widened portion. Preferably, the majority of said outlet openings point substantially in the direction of the narrow portion in that case, and preferably at least one of the outlet openings points away from the narrow portion.

[0008] Preferably, at least one weight extends around the narrow portion, which weight can preferably move freely over the narrow portion. The weight preferably has a larger lateral diameter than the wide portion. In the pre-

ferred embodiment, several such weights extend around the narrow portion, which weights can move freely over said narrow portion and which exhibit an increasingly larger diameter, seen in the direction from the wide portion. The first weight is preferably substantially frustoconical in shape, seen in the direction from the wide portion. The first weight is preferably provided with guide slots along its frustoconical surface, which guide slots extend in the direction toward the point of the conical wide portion. The other weights are preferably substantially disc-shaped. The weights are provided with a hole in the centre thereof, so that they can move up and down over the narrow portion, which is preferably in the form of a shank. The weights are preferably made of metal and/or concrete.

[0009] The invention will now be explained in more detail with reference to an embodiment as shown in the figures, in which:

Figure 1 is a perspective view of a first embodiment of an anchor sunk in a seabed;

Figure 2 is a partially cutaway perspective view of a the anchor of figure 1;

Figures 3 and 4 are cutaway perspective detail views of the anchor of figure 1; and

Figures 5, 6 and 7 are perspective views of a second embodiment of an anchor.

[0010] The anchor shown in figure 1 comprises a hollow shank 1, which is provided with a hollow, substantially conical, widened head 2 at the bottom side. Attached to the anchor is a chain (not shown), which connects the anchor to a buoy 3 at the water surface. A water conduit 4 extends in the lower part of the hollow shank 1, which water conduit is connected to a water hose 5 in the upper part of the shank, which water hose extends through the upper opening in the shank, along the chain, to the buoy 3 at the water surface.

[0011] Figure 4 shows that the bottom side of the water conduit 4 is provided with a distribution chamber 6, to which several water channels 7, 8 connect. One water channel 7 extends from the distribution chamber to the point of the head 2, the other four water channels 8 extend from the distribution chamber 6 to the upper surface of the head 2. The outlet openings of the water channels 8 are provided with nozzles which are directed upwards and which are arranged at regularly spaced intervals around the shank 1 near the outer side of the upper surface of the head 2. The nozzles are slightly recessed in the wall of the head 2.

[0012] The anchor is furthermore provided with a frustoconical metal weight 9, which has an axial through bore having a diameter that corresponds to the diameter of the shank 1. The weight 9 can thus slide over the shank 1. The bottom side of the weight 9 has approximately the

same diameter as the upper side of the head 2, and the weight 9 rests on the upper side of the head 2 in such a manner that the diameter of the weight increases in upward direction. As a result, the head 2 and the weight 9 jointly form a conical, widened body. The weight 9 is provided with guide slots 10 in the frustoconical surface thereof, which guide slots extend from the bottom upwards.

[0013] Furthermore, four concrete weights 11, 12, 13, 14 are provided on the anchor. Said weights are substantially disc-shaped, being provided with an axial bore having a diameter that corresponds to the diameter of the shank 1. As a result, the weights 11, 12, 13, 14 can slide over the shank 1. The lowermost concrete weight 11 rests on the metal weight 9, and has a diameter which is larger than the diameter of the upper side of the metal weight 9. The weights 12, 13, 14 above said weight 11 each have a larger diameter than the respective weights 11, 12, 13 thereunder. In this way the head 2 and the weights 9, 11, 12, 13, 14 jointly form a substantially conical widened body. The concrete weights 11, 12, 13, 14 are provided with reinforcing elements in the form of reinforcing bars 15.

[0014] Figure 3 shows that the shank 1 is provided with a (hoisting) eye 16 at the upper side for attaching the chain. The eye 16 is fixed to a horizontal pin 17 of an attachment member 18, in such a manner that the eye 16 can pivot about the horizontal pin 17. The attachment member 18 is connected to the shank 1 by means of a slide bearings 20, 21 in such a manner that the eye 16 can pivot about a vertical axis.

[0015] In the embodiment shown in figures 2, 3 and 4, the shank 1 is provided with holes 22 near the upper side, through which seawater, sand or clay can enter the shank 1 and the head 2. In the embodiment shown in figures 5, 6 and 7, the shank 1 and the head 2 are filled with concrete 23.

[0016] The anchor as described in the foregoing is also suitable, for example, for anchoring a cellar of a building in the ground, so as to enable the building to withstand the upward pressure of rising groundwater. In that case, several anchors are installed in the ground, for example near the corners of the cellar, after which the cellar is attached to the sunken anchors upon placement of the cellar.

Claims

1. An anchor comprising a narrow portion and a widened portion connected thereto, **characterised in that** the anchor is provided with at least one liquid channel, which has a connection for a liquid supply line at one end and which has at least one outlet opening at the other end, which outlet opening is present in the outer surface of the widened portion.
2. An anchor according to claim 1, wherein the narrow

portion is made up substantially of a shank.

3. An anchor according to claim 2, wherein said shank is hollow or filled with a mass which is heavier than water, for example concrete.
4. An anchor according to claim 3, wherein the liquid channel extends through the hollow or filled shank.
5. An anchor according to any one of the preceding claims, wherein the liquid channel extends from the anchor in a flexible hose, such that said hose can extend toward and above the water surface upon installation of the anchor.
6. An anchor according to any one of the preceding claims, wherein the widened portion is substantially conical in shape, with the point of the cone pointing away from the narrow portion.
7. An anchor according to any one of the preceding claims, wherein the liquid channel is split, with several outlet openings being present in the outer surface of the widened portion.
8. An anchor according to claim 7, wherein most outlet openings point substantially in the direction of the narrow portion.
9. An anchor according to any one of the preceding claims, wherein at least one of the outlet openings points away from the narrow portion.
10. An anchor according to any one of the preceding claims, wherein at least one weight extends around the narrow portion.
11. An anchor according to claim 10, wherein the wake element can move freely over the narrow portion.
12. An anchor according to claim 10 or 11, wherein the weight element has a larger lateral diameter than the wide portion.
13. An anchor according to claim 10, 11 or 12, wherein several weights extend around the narrow portion, which weights can move freely over said narrow portion and which exhibit an increasingly larger diameter, seen in the direction from the wide portion.
14. An anchor according to any one of the preceding claims 10-13, wherein, seen from the wide portion, the first weight is substantially frustoconical in shape.
15. An anchor according to claim 14, wherein the first weight is provided with guide slots along its frustoconical surface, which guide slots extend in the direction toward the point of the conical wide portion.

