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(54) **A method and apparatus for making nautical mooring lines emerge from a sea-floor**

(57) An apparatus for making nautical mooring lines
(8) emerge from a sea-floor comprises:
- an element (11) connected to at least one mooring line
(8) lying on the sea-bottom and connected directly or
indirectly to a sinker (7), said element (11) being so
shaped as to retain air blown into it;

- means (4) for blowing air into the element (11) in such
a way as to cause it temporarily to surface.

The method provides for blowing air into an element
(11) connected to at least one line (8) lying on the sea-
bottom in such a way as to cause it temporarily to surface.

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Description

[0001] The present invention relates to a method and an apparatus for making nautical mooring lines emerge from a sea-floor, avoiding a series of hazardous and dirtying manual operations.

[0002] According to the prior art, boats moored in harbour are normally moored stem to the pier by means of a first line, then their bow needs to be secured.

[0003] To secure the bow, it is necessary to use a boat hook (i.e. a rod at whose end is fastened a hook) to retrieve a line anchored to a chain in proximity to a sinker on the bottom.

[0004] The chain is anchored at one end on the surface to the pier and at the other end to the sinker on the bottom.

[0005] The sinker or fixed body is normally constituted by a heavy cement block having anchoring functions.

[0006] The operation of retrieving the line by means of the boat hook is rather hazardous because it forces the user to lean out of the boat and it is also long and difficult because it is necessary to move up manually along the chain until finding the line. Moreover, during this manual operation it is rather common to be dirtied as a result of the fact that the chain itself is dirty because it is rich in debris and algae accumulated on the bottom.

[0007] Once the line is found, it is secured to a bow cleat.

[0008] In some cases, for a better mooring of the boat, two lines are retrieved, to be secured to two bow cleats.

[0009] Another prior art provides for mooring posts anchored on the bottom and emerging on the surface, but in this case the surface of the water is dotted by the presence of a plurality of posts that practically form obligated mooring ways that are rather hazardous and difficult to centre by the boats, especially for those who are not particularly versed in steering such boats. Therefore, this kind of anchoring technique is not widely used.

[0010] An object of the present invention is to eliminate the aforesaid drawbacks making available a method and an apparatus that enable to moor a boat rapidly and without dirtying oneself by easily finding and handling the mooring lines.

[0011] Said objects are fully achieved by the method and by the apparatus of the present invention, which are characterised by the content of the claims set out below and in particular in that the apparatus comprises:

- an element connected to a line lying on the bottom anchored to a fixed body or sinker, said element being shaped in such a way as to hold air blown into its interior;
- means for blowing air into the element in such a way as to cause it temporarily to surface.

[0012] The method provides for blowing air into an element connected to a line lying on the sea-bottom in such a way as to cause it temporarily to surface.

[0013] This and other characteristics shall become

more readily apparent from the description that follows of a preferred embodiment, illustrated purely by way of non limiting example in the accompanying drawing tables in which:

- figure 1 shows a perspective view of the apparatus;
- figure 2 shows a vertical section view of the apparatus;
- figure 3 shows a circuit diagram of the routing unit;
- figure 4 shows an overall view of the apparatus.

[0014] With reference to the figures, the number 1 indicates a fixed pier or a floating jetty or a mole to which to moor boats 2.

[0015] A compressor 3 feeds compressed air to a plurality of routing units 4 through a conduit 5.

[0016] The number 6 indicates chains having a first end anchored to the pier 1 and another end anchored to a fixed body 7, called sinker, positioned on a sea-bottom or sea-floor 20.

[0017] The sinker is normally a block of cement or other material suitable to constitute an anchoring point on the sea-bottom.

[0018] According to the prior art, lines 8 are fastened to the chain and it is therefore the chain that must be retrieved, with the help of a boat hook, until finding the lines that enable to moor the bow of a boat 2 by using appropriate cleats 9, after the stem is moored by means of additional cleats 10 and a line, not shown, anchored to the pier.

[0019] According to the present invention instead, originally, the lines 8 have a free end for anchoring and an end connected to an element 11 which is shaped in such a way as to be able to retain air blown into its interior.

[0020] In particular, the element 11 can be for example an inflatable balloon (as in the illustrated embodiment) or an umbrella-shaped or cone-shaped body, open inferiorly.

[0021] The element 11 in turn is connected directly or indirectly to the fixed body 7.

[0022] Under normal conditions the element 11 is substantially airless and it lies on the sea-bottom.

[0023] When it is necessary to have one or more lines to moor a boat through a control present on the unit 4, or through a radio control, it is possible to activate the injection of compressed air into an off-take conduit 12 preferably associated with the chain 6.

[0024] This is preferably a conduit, or rubber sleeve, or tube made of soft plastic, in whose interior runs an air hose together with a small chain or steel cable connected to the sinker.

[0025] The off-take conduit ends in the element 11 in such a way that the air blown inside said element causes it temporarily to surface, allowing easily to retrieve the line or the lines connected thereto.

[0026] The cessation of the injection of air or, according to an embodiment variant, the aspiration of the air, then enable a rapid return of the element 11 on the sea-

bottom.

[0027] If the element 11 should remain on the surface, it would in any case be destined to return to the sea-bottom at the time of the unmooring of the boat, because it is dragged on the bottom by the weight of the lines (to the lines can also be associated additional weights to promote their descent on the sea-bottom when unmooring).

[0028] The original unit 4 regulates the various steps of inflating and deflating the element 11. Commands can be given through pushbuttons or levers present on the unit itself or by means of a remote control with multiple pushbuttons.

[0029] It is possible that when a pushbutton that commands inflation is released, deflation is automatically triggered, or pressing a deflation pushbutton may be required.

[0030] The activation of the injection of compressed air is achieved by opening a valve of the unit 4 whilst a Venturi type of valve operates for deflation.

[0031] The invention overcomes the drawback of having to operate hazardously from the side of the boat to grip the chain from the pier pulling it by strength of hand from the bottom to make the lines emerge, and that of soiling the user and the side of the boat with mud.

[0032] According to an embodiment variant, not illustrated, instead of making the lines surface directly, it is possible to make slots of strings connected to the lines.

[0033] To each off-take conduit 12 is then associated the mooring of a boat by means of one or two lines for the bow cleats.

[0034] The off-take conduit 12 is preferably associated to a chain wound thereto or incorporate therein by means of a heat-shrinking plasticised containment band.

[0035] The chain can be engaged to the existing chain 6, or to the sinker 7, or to an additional sinker.

[0036] Air pressure is preferably between 0.8 bar and 3 bar.

[0037] The unit 4, which constitutes means to blow air into the element 11 in such a way as to cause it temporarily to surface comprises an inlet conduit 13 fed by the compressor 3 with compressed air at the pressure of about 8 bar.

[0038] Internally to the unit, the inlet conduit 13 splits in two branches: a branch comprises a pressure reducer 14 (from 8 to about 1.5 bar, or otherwise a value between 0.8 and 3 bar) and a two-way blowing valve 15, whilst the other branch comprises an electrical valve 16 that activates deflation using a Venturi type valve 17 that works in a vacuum with the piping segment 18.

[0039] Under resting condition, the compressed air is blocked by the closure of the blowing valve 15 and it is therefore not sent to the off-take conduit 12; the valve 16 is also closed.

[0040] During inflation, the valve 15 opens towards the conduit 12 letting flow the air destined to inflate the element 11, whilst the valve 16 remains closed.

[0041] When the inflation is complete, the air re-enters

from the off-take conduit 12 through the valve 15 towards the Venturi valve 17 and flows outside the unit through an outlet conduit 19. To facilitate deflation, the valve 16 can be open.

[0042] The unit 4 is powered by one or two 12 V batteries, but it can also be connected to the 220 V mains normally present, in this case adopting an intermediate transformer.

Claims

1. An apparatus for making nautical mooring lines (8) emerge from a sea-floor, **characterised in that** it comprise:
 - an element (11) connected to at least one mooring line (8) lying on the sea-bottom or sea-floor and connected directly or indirectly to a sinker (7), said element (11) being so shaped as to retain air blown into it;
 - means (4) for blowing air into the element (11) in such a way as to cause it temporarily to surface.
2. An apparatus as claimed in claim 1, wherein the element (11) is an inflatable balloon.
3. An apparatus as claimed in claim 1, wherein the element (11) is a hollow element with lower opening for blowing air.
4. An apparatus as claimed in claim 1, wherein the means for blowing air comprise a control unit (4), provided with electrical valve, which receives compressed air from a compressor (3) and regulates its delivery to a partially submerged feed conduit (12) terminating in the element (11).
5. An apparatus as claimed in claim 4, wherein said means are bidirectional, in the sense that they can also aspirate air from the element to facilitate its immersion.
6. An apparatus as claimed in claim 1, wherein a radio control is present for activating/deactivating of said means.
7. A method for making nautical mooring lines emerge from a sea-floor, **characterised in that** it comprises the blowing of air into an element (11) connected to at least one mooring line (8) lying on the sea-bottom in such a way as to cause it temporarily to surface.
8. A method as claimed to claim 7, wherein the blowing of air is radio controlled.
9. A method as claimed in claim 7, wherein the blowing

of air is regulated by means of a unit (4) provided with electrical valves.

10. A method as claimed in claim 7, wherein an automatic progressive loss of air by the element occurs, after the blowing is completed, with the return of the element on the sea-bottom. 5
11. A method as claimed in claim 7, wherein after the blowing of air and after the surfacing of the element connected to the mooring line, there is a step of aspirating air from the element to enable its return to the sea-bottom. 10

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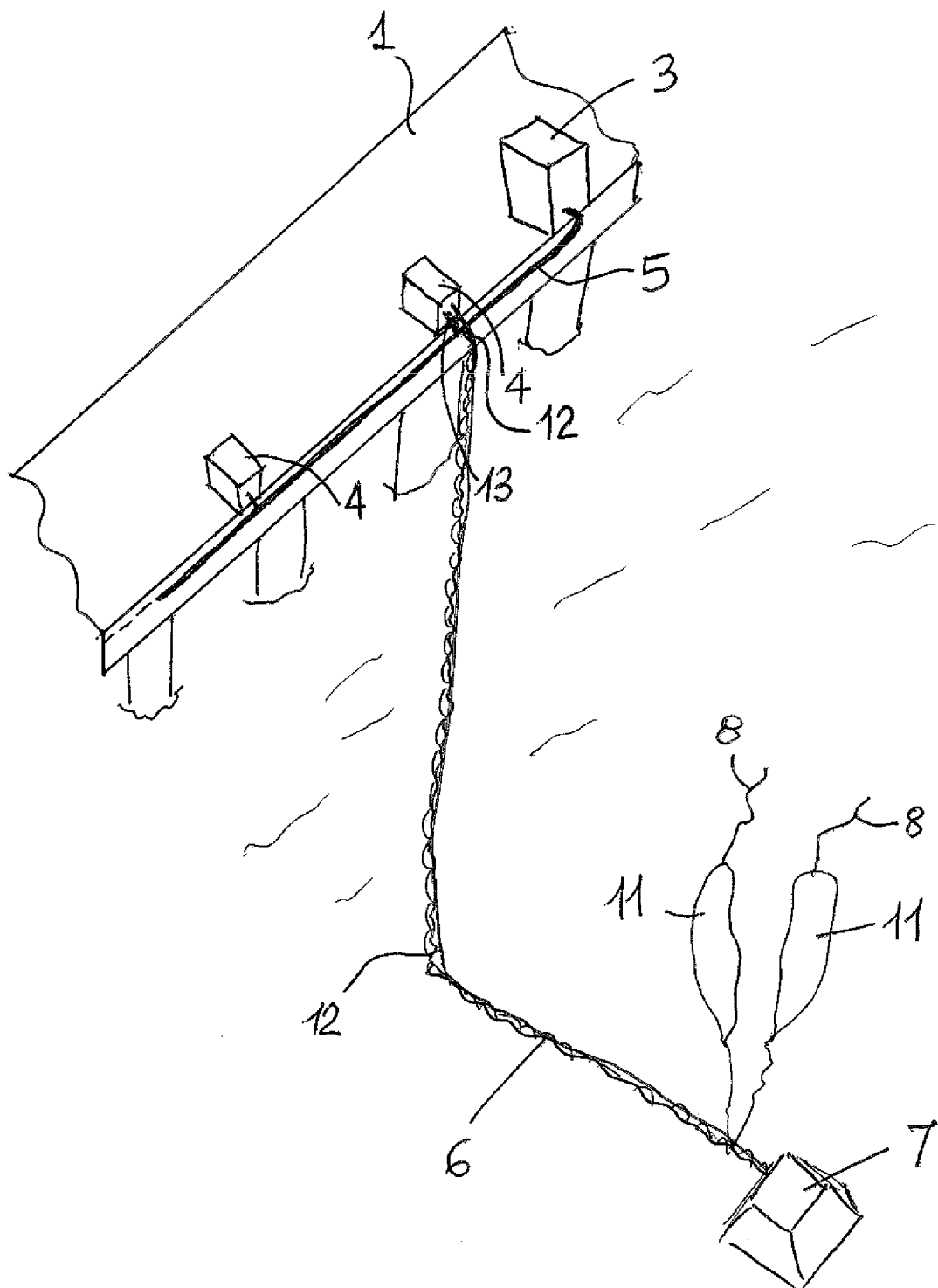


FIG. 1

FIG. 2

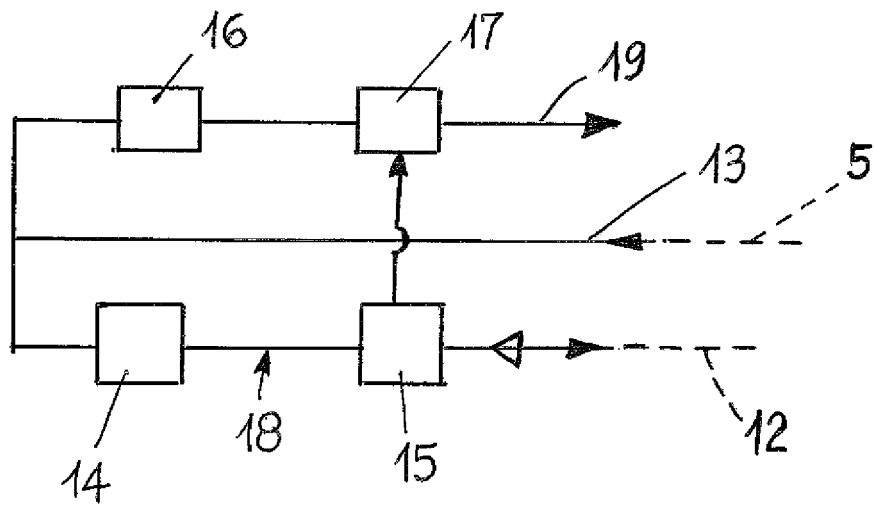
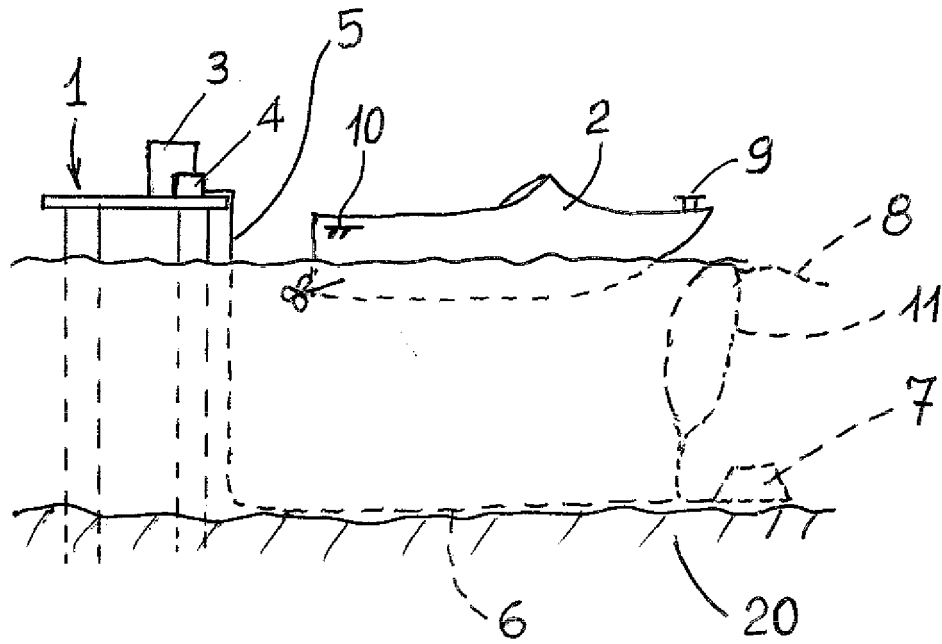


FIG. 3

