Abstract: A protective device (1) for a boat (16) and a method of providing such a protective device (1) which floats on a body of water (19) are described, the protective device (1) including a bottom portion (11) which is arranged to be placed floatingly or submergedly in the water (19) underneath the hull of the boat (16), a top portion (11) which is connected to the bottom portion (11'), the top portion (11) being constituted by a cloth-like material and being included at least as part of or being connected to a supporting device (18) to be able to support at least a portion of the top portion (11) in a distended position.
PROTECTIVE DEVICE FOR A BOAT AND METHOD OF USING SAME

The present invention relates to a device and a method for the protection of a boat. More particularly, it relates to a protective device for a boat which is floating in a water, the protective device including a bottom portion which is arranged to be placed floatingly on or submerged in the water underneath the hull of the boat, and a top portion which is connected to the bottom portion.

The invention is directed in particular, but not exclusively, towards the protection of pleasure boats which have a reduced frequency of use for periods of the year. Still, it is to be emphasized that the protective device is also useful in periods of the year with a high frequency of use, for example, several times weekly.

In particular during the winter season it may be desirable to protect a boat from precipitation and wind. This may be done by covering the boat with a tarpaulin or other provisional devices, or the boat may be placed in a building either on water or on land. It may also be desirable to protect the boat throughout the year from contaminants like airborne particles and bird droppings and from sunlight.

The present invention is directed towards boats that are floating in water, thereby allowing use of the boat all year
round without the boat having to be carried to or from a storage site on land.

So-called boathouses of the kind in which the boat is placed floatingly under a superstructure provide good protection against precipitation and wind. This is particularly true when the boathouse is provided with a closable opening. However, such buildings are expensive. In addition, in many countries, permission from the authorities is required in order to erect such permanent buildings, which is very hard to get in many places. Because of that, only a very limited number of boathouses are available, and boathouses are therefore not a real alternative for the great majority of boat owners.

A drawback of such boathouses is, however, that it is not normally possible in practice to protect the hull of the boat and submerged propulsion means from corrosion which is particularly pronounced in sea water, from fouling, and from possible ice.

From the publication NO 165532 B a floating boathouse which has the form of a floatable cover is known. The cover is shaped and dimensioned to have a relatively tight fit around the boat which it is to accommodate. The cover is provided with a closable opening through which the boat may be moved in. The boathouse is provided with mooring means, which secure the boathouse, and thereby the boat to a so-called mooring finger, for example. It is also proposed to provide the boathouse with a drainage pump to drain the water from the boathouse so that the boat is stored dry.

The boathouse according to NO 165532 B solves several of the drawbacks related to protecting a pleasure boat placed in storage from the elements and from contaminants.
However, there are some drawbacks relating to the cover according to NO 165532.

It is proposed in NO 165532 that the cover be formed with a relatively tight fit against all sides of the boat. This will mean that each cover must be "tailored" to the individual boat, which may entail relatively large costs. In addition, a tight-fitting cover could cause limited or poor air circulation between the boat and the cover, which could induce condensation problems with subsequent moisture damage. The biggest drawback is probably related to the fact that the cover must be formed of a relatively robust material to maintain the desired shape.

The fact that the boathouse is formed with a relatively tight fit will mean that it will not be possible for a person to stay between the outside, for example the deck, of the boat and the cover. Thus, the boat must be moved out of the cover if maintenance is to be carried out on the boat. Thereby the advantages of the boathouse cannot be utilized if the boat is going to receive surface treatment and it at the same time is a desire to have protection against dust or precipitation, for example.

From the publication US 5,138,963 a U-shaped dock is known, which is provided with a bottom portion. The bottom portion is constituted by a flexible and watertight material which is attached to and hangs down from the internal periphery of the dock. In the publication it is also suggested a top portion to provide a protective roof for a boat which is placed in the dock. The top portion is attached to the dock independently of the bottom portion. Thus, the top portion and the bottom portion are both dependent on being attachable to the dock.
The invention has for its object to remedy or reduce at least one of the drawbacks of the prior art, or at least to provide a useful alternative to the prior art.

The object is achieved through features which are specified in the description below and in the claims that follow.

According to a first aspect of the present invention, a protective device is provided for a boat floating in a water, the protective device being arranged to enclose both the portion of the boat which is submerged in the water and the portion which is above a waterline, the protective device being constituted by a cloth-like material which is formed as a bag, which bag is included at least as part of or is connected to a supporting device to be able to support at least a portion of the bag which is above the waterline in a distended position.

In its simplest form the protective device may be constituted by, for example, a partially immersed pipe body which is arranged to accommodate a boat.

The advantages of using a cloth-like material are several. Among other things, a cloth will be flexible when affected by external forces, it has a relatively low weight and it can be packed up when not in use.

It is an advantage if the protective device is provided with at least one closable opening.

The supporting device may be arranged to be activatable. In one embodiment, the activatable supporting device is activated by means of a gas.

The gas may be air, for example, which is filled into the activatable supporting device.
The gas which is filled into the activatable supporting device has a pressure which is higher than the pressure outside the activatable supporting device.

The protective device includes a bottom portion and a top portion which can be formed by the same material or by different materials. In one embodiment, the bottom portion and the top portion are made in one piece and from the same material.

The bottom portion may be arranged to float on or be submerged in the water. If, in the latter variant, the bottom portion is made of a floatable material, it is an advantage if the bottom portion is connected to one or more sinker elements which ensure that the bottom portion is pulled down into the water in order thereby to facilitate the movement of the boat into the protective device.

The bottom portion could also be made with a double bottom or some other form of container which could be activated to increase the buoyancy of the protective device. This will be relevant in the case of the protective device being of the type that floats on the water. To facilitate the movement of the boat in and out, the bottom portion can be filled with or emptied of a gas such as air.

In an alternative embodiment, the bottom portion may be made of a buoyancy material of a relatively solid form and which cannot be filled with or emptied of a gas in its situation of use. In this alternative embodiment, the bottom portion may be made in one piece or in several pieces which have been connected to each other.

In one embodiment, the activatable supporting device is constituted by one space which is defined by the top portion and bottom portion and possibly a water surface on or in
which the bottom portion is floating or submerged. In such an embodiment, the activatable supporting device will be "punctured" when at least one of the at least one closable opening is open.

To provide an activatable supporting device which is independent of whether the closable opening is open or not, the activatable supporting device is constituted, in one embodiment, by several elongated channels arranged in connection with the top portion.

In one embodiment the activatable supporting device is constituted by a double cloth which is arranged to form one or more spaces.

In one embodiment, the activatable supporting device is constituted by a combination of two or all of the above-mentioned supporting devices.

By providing the supporting device of the protective device exclusively by means of one or more of the above-mentioned activatable supporting devices, the protective device may easily be folded up after the gas in the supporting devices has been equalized with the pressure outside the supporting devices.

In one embodiment, the top portion is further provided with one or more mechanical supporting elements which are arranged to support at least a portion of the top portion in a distended position independently of the activatable supporting device. An example of a mechanical supporting element which may be suitable is an elongated rod element. It is an advantage if the rod element is elastically flexible.

It is an advantage if the liquid in which the boat is floating inside the protective device can be isolated from
the water in which the protective device is floating, after the closable opening has been closed. This gives the possibilities of placing the boat in a liquid which is less corrosive than sea water for example, is frost-proof, could reduce fouling and/or has other preferred properties.

If it is desirable to avoid osmosis between the water in the protective device and the water in which the protective device is floating, the bottom portion must be made of a sufficiently diffusion-tight material. Such a material could also provide galvanic isolation between the boat and the water in which the protective device is floating.

To reduce the risk of undesired leakage between the liquid in the closed protective device and the water on the outside, it is an advantage if at least one of the at least one closable opening has, in its closed position, an inlet portion which is above the water surface of the water in which the protective device is floating.

In one embodiment, the protective device is provided with mooring openings so that the moorings of the boat can be passed through the openings substantially independently of the protective device. This has the advantage of loads from the boat being transmitted directly to a landing stage, for example, or another mooring point, and not by way of the protective device. The protective device may thereby be dimensioned weaker, in terms of strength. Because of the through-going moorings, the protective device and the boat can, to a certain degree, be moved independently of each other.

In a second aspect of the invention, a method of providing a protective device for a boat on a body of water is provided, wherein a bottom portion of the protective device is placed
floatingly on or submerged in the water, and a top portion which is connected to the bottom portion is placed over at least a portion of the boat, and wherein the method includes supplying an activatable supporting device included in the top portion with a gas at overpressure in order thereby to support at least a portion of the top portion in a distended position.

Further features will appear from the dependent claims 15-21 and from the description that follows.

In what follows is described an example of a preferred embodiment which is visualized in the accompanying drawings, in which:

Figure 1a shows a side view of a protective device according to the present invention;

Figure 1b shows an end view of the protective device shown in figure 1a, viewed from the left towards the right;

Figure 2a shows a side view of a protective device according to the present invention, in which a closable opening is in an opened position;

Figure 2b shows an end view of the protective device shown in figure 2a, viewed from the left towards the right;

Figure 3a shows a side view of a protective device which has been folded up around a drum; and

Figure 3b shows the folded up protective device of figure 3a seen from the left towards the right.

In the figures, like or corresponding elements are indicated by the same reference numerals.

In the figures, the reference numeral 1 indicates a
protective device according to the invention. The protective
device 1 is placed between two mooring fingers 3. The mooring
fingers 3 are secured to a quay 5 in a manner known per se.

In what follows, the protective device 1 will also be
referred to as a boathouse 1.

The boathouse 1 is formed as an elongated, sausage- or bag-
shaped body 10 which is provided with a first end portion 12
and a second end portion 14. The body 10 is constituted by a
top portion 11 and a bottom portion 11' connected thereto.

In the embodiment shown, only the first end portion 12 is
arranged to be opened so that a boat 16 (shown in figures 1b
and 2b) may be moved into the boathouse 1. However, it will
be understood that in an alternative embodiment (not shown)
the other end portion 14 may be openable as well.

The body 10 of the boathouse 1 is provided with several
channels 18 extending parallel to the longitudinal direction
of the body 10 and perpendicularly to the longitudinal
direction of the body 10. The latter channels 18 may extend
from a water surface 19 on one side of the boathouse 1 over
to the water surface 19 on the other side of the boathouse 1.

The channels 18 could also be positioned in the water surface
19 along portions of the boathouse 1 to provide stability and
buoyancy therein. This embodiment is not shown in the figures
but will be particularly relevant when the boathouse 1 is
placed in a freely floating manner (without any mooring
fingers 3) and secured to a mooring point.

In the embodiment shown, the body 10 constitutes part of the
channels 18.

The channels 18 are provided with a valve (not shown) of a
kind known *per se* in order that the channels 18 can be filled with or emptied of a gas such as air. The channels 18 may be interconnected or they may be separated.

When the channels 18 are supplied with air at overpressure relative to the ambient pressure of the boathouse 1, the channels 18 will inflate and distend the boathouse 1. The air-filled channels 18 thus form a supporting device for the boathouse 1.

Depending on the number and dimensions thereof, the channels 18 could provide a complete supporting device for holding the boathouse 1 in its distended condition.

Instead of, or in addition to, air-filled channels 18, the supporting device of the boathouse 1 may be provided by means of mechanical supporting devices, such as elastic rods of the kind used in so-called mountain tents. The rods may then be inserted into guides which replace or supplement said channels 18.

The supporting device of the boathouse 1 may also be provided by pumping a gas, preferably air, into the boathouse 1 after it has been closed. In what follows, the gas will be referred to as air. However, it is to be emphasized that other gases than air may be used for the purpose.

Even though air that has been pumped into the boathouse 1 may inflate the boathouse 1 when the top portion is made of a cloth-like material, it will normally be desirable, for practical reasons, to have additional supporting devices provided by means of said channels 18 and/or rods, or possibly by a body 10 formed by a double cloth which is inflated. This is in order for the boathouse 1 not to collapse when the first end portion 12 is brought from the closed position shown in figures 1a and 1b into the open
position as shown in figures 2a and 2b, or when an access opening 13 for a person is brought from a closed position into an open position.

In the embodiment shown, the first end portion 12 is provided with elastic ribs 20 which extend, in figure 2a, from guides in an end portion of the body 10 through guides in an end portion 12. The ribs 20 may be, for example, of the same kind as the elastic rods mentioned above.

The ribs 20 may be connected to an annular body 22 which is arranged in a guide, for example, in a transition portion between the body 10 and the first end portion 12.

Both the annular body 22 and the ribs 20 can be removed from said guides.

The primary purpose of the annular body 22 is to provide a relatively shape-stable opening while, at the same time, it provides support when the ribs bend as the opening in the first end portion 12 is being closed.

If the bottom portion and the top portion are made of a rigid, tubular body, for example, the above-mentioned annular body 22 will normally not be necessary.

The end portion 12 may be brought into a closed position, as shown in figures 1a and 1b, by bringing the ribs 20 towards each other at the outer edge of the end portion 12. This may be achieved by placing a string or wire in a slide guide at said outer edge, so that the end portions of the ribs 20 are brought together at a constriction portion 21.

In the embodiment shown, the constriction portion 21 is above the water surface 19, and leakage between water inside the boathouse 1 and outside the boathouse 1 is thereby
substantially prevented.

In its closed position, the boathouse 1 provides protection of the boat 16 from the elements, from contaminants like airborne particles and bird droppings and, depending on the degree of opaqueness of the body 10, from sunlight.

To provide a desired climate inside the boathouse 1, a ventilation device and/or an air-conditioning plant (not shown) of a kind known *per se*, may be placed in connection therewith. In the embodiment which is shown in figures 1a and 1b, the constriction portion 21, among other things, could be a leakage point. Air which is carried into the boathouse 1 through the second end portion 14, for example, may thereby flow through the space of the boathouse 1 and out through said leakage point. Thereby air exchange which would be favourable to the air humidity inside the closed boathouse 1 is provided.

To provide overpressure inside the boathouse 1, the air supply rate must, of course, be higher than the overall leakage rate of the boathouse 1.

The overpressure inside the boathouse 1 could also be measured by a pressure sensor which is connected to an alarm installation. When considerable pressure changes are detected while, at the same time, the alarm is activated, one or more signals will be emitted. This may be very useful in case of, for example, a burglary or by possible damage to the cloth of the boathouse 1.

The ventilation plant could also be connected automatically to a fire retardant of a kind known *per se*, or be controlled automatically to evacuate air which is within the protective device upon the detection of smoke, heat above a predetermined level or flames.
Because of the fact that the water within the boathouse 1 may be isolated from the water outside the boathouse when the first end portion 12 is closed, the water inside the boathouse 1 may be optimized for a boat which is in winter storage, for example. Any sea water may be replaced with freshwater and antifreezing and/or antifouling agents may be added to the water. By connecting a hose (not shown) between the cooling-water discharge from the motor of the boat 16 and an outside of the boathouse 1, the water may easily be pumped out by means of the cooling-water pump of the boat. Alternatively, a separate pump may be used. For possible replacement of the water which is pumped out of the boathouse 1, freshwater, for example, may be introduced into the boathouse by means of a hose (not shown).

The protective device 1 according to the present invention could be module-based. By this is meant that the body 10, for example, could be made in sheets of cloth which may be joined by means of means known per se, such as, but not limited to, a zip fastener, a Velcro® fastener, a rail system, which could all provide a sufficiently tight joint. Thus, the protective device 1 could be adapted for boats of different sizes.

The figures 3a and 3b show the protective device 1 in a collapsed position in which the protective device 1 has been rolled onto a drum 24, thereby occupying minimal space. In the embodiment shown, the ribs 20 and ring 22 have been removed from the first end portion 12.

The present invention thus provides a boathouse 1 which possesses substantial advantages compared with prior art boathouses, also with respect to flexibility.
Claims

1. A protective device (1) for a boat (16) which is floating in water (19), the protective device (1) being arranged to surround both the portion of the boat which is submerged in the water and the portion which is above a waterline, characterized in that the protective device (1) is constituted by a cloth-like material which is formed as a bag, which bag is included at least as part of or is connected to a supporting device (18) to be able to support at least a portion of the bag which is above the waterline in a distended position.

2. The protective device (1) according to claim 1, wherein the protective device (1) includes at least one closable opening.

3. The protective device (1) according to claim 1, wherein the supporting device (18) is activatable and is arranged to be activated by means of a gas.

4. The protective device (1) according to claim 3, wherein the activatable supporting device (18) includes one space which is defined by a top portion (11) of the supporting device which is above the water surface and by a bottom portion (11') which encloses the submerged portion of the boat and possibly a body of water (19).

5. The protective device (1) according to claim 4, wherein the activatable supporting device (18) includes several elongated channels (18) arranged in connection with the top portion (11).
6. The protective device (1) according to any one of claims 3 to 5, wherein the activatable supporting device (18) includes a double cloth which defines one or more chambers arranged to contain the gas.

7. The protective device (1) according to any one of claims 3 to 6, wherein the gas is air.

8. The protective device (1) according to claim 4, wherein the top portion (11) is further provided with one or more mechanical supporting elements which are arranged to support at least a portion of the top portion (11) in a distended position independently of the activatable supporting device (18).

9. The protective device (1) according to claim 2, wherein at least one of the at least one closable opening has, in its closed position, an inlet portion which is above the water (19).

10. The protective device (1) according to any one of the preceding claims, wherein the protective device (1) is further provided with a buoyancy means (11', 18).

11. The protective device (1) according to claim 10, wherein the buoyancy means is formed by or is included at least as part of the supporting device (18) which is above the water surface.

12. The protective device (1) according to claim 10, wherein the buoyancy means is formed by or is included at least as part of the portion of the supporting device which is underneath the submerged portion of the boat.
13. The protective device (1) according to claim 1, wherein the protective device (1) is provided with mooring openings, so that moorings of the boat (16) may be passed through the openings substantially independently of the protective device (1).

14. A method of providing a protective device (1) for a boat (16) on a water (19), wherein a bottom portion (11') of the protective device (1) is placed floatingly on or submerged in the water (19), and wherein a top portion (11) which is connected to the bottom portion (11') is placed over at least a portion of the boat, characterized in that the method includes supplying an activatable supporting device (18) included in the top portion (11) with a gas at overpressure in order thereby to support at least a portion of the top portion (11) in a distended position.

15. The method according to claim 14, wherein the method further includes supplying an inflatable container in the bottom portion (11') with a gas.

16. The method according to claim 14, wherein the method further includes providing ventilation of the air which is inside the protective device (1).

17. The method according to claim 16, wherein the method further includes connecting a fire retardant to the ventilation plant or operating the ventilation plant to evacuate air within the protective device (1) upon the detection of smoke, heat or flames.

18. The method according to claim 14, wherein the method further includes placing a sensor arranged to detect changes in pressure inside the protective device (1).
19. The method according to claim 14, wherein the method further includes controlling the climate in the protective device (1) by means of an air-conditioning plant.

20. The method according to claim 19, wherein the method further includes connecting a fire retardant to the air-conditioning plant or operating the air-conditioning plant to evacuate air within the protective device (1) upon the detection of smoke, heat or flames.

21. The method according to claim 14, wherein the method further includes supplying or replacing some or substantially all of the water in the bottom portion (11') of the protective device (1) with another liquid.
## A. CLASSIFICATION OF SUBJECT MATTER

**IPC:** see extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC.

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

**IPC:** B63B, B63C, E04H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE, DK, FI, NO classes as above

Electronic data base consulted during the international search (name of data base and where practicable, search terms used)

**EPO-INTERNAL, WPI DATA, PAJ**

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<th>Relevant to claim No.</th>
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### Date of the actual completion of the international search

22 December 2010

### Date of mailing of the international search report

03.01.2011

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International patent classification (IPC)

B63B 59/00 (2006.01)
B63B 59/04 (2006.01)
E04H 15/20 (2006.01)
E04H 15/22 (2006.01)

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Cited literature, if any, will be enclosed in paper form.
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International application No. PCT/N02010/000352