Published Chinese utility model CN 202555020 discloses a full-light covered top type device for a mud storing pond. The device mainly solves the problem that an existing mud storing pond cannot normally operate due to freezing in winter and is characterized in that top beams are connected with the top of a vertical column, the top beams in arc shapes are parallel to each other, evenly distributed, and connected through transverse beams, and the outer surfaces of the top beams are covered by sunlight plates. Although this full-light covered top type device for the mud storing pond is strong in cold resistance capacity, it is very expensive to establish and is alien from an ideal heat insulating and bird repelling solution as well.

These problems have been attempted to solve by floating ball blankets as disclosed in prior art documents WO 2011/161675 A2, EP 2354377 A2 and FR 2758356 A1, providing a highly effective solution to difficult liquid storage problems above mainly in petrochemical, metal treatment and air-transport industries (see: www.euro-matic.com). By placing a sufficient quantity of hollow plastic balls onto the surface of a liquid, the balls automatically arrange themselves into a close packed formation. In a single layer on the liquid surface they virtually cover over 91% of the surface area, greatly reducing sunlight penetration and therefore liquid evaporation. The thermal insulating qualities of such balls also assist in maintaining winter operating temperatures of the water. Such a high surface coverage provides an extremely effective barrier and significantly reduces the mass and heat transfer mechanisms operating between the liquid and surrounding environment. A thermal insulation barrier is achieved through the air held in each ball and the poor heat conductivity of plastic. The air pockets between the balls, although not sealed, also contribute to this cellular insulation system which dramatically reduces heat loss. The low liquid surface area exposed to atmosphere dramatically reduces liquid loss

least partly filled with a liquid, e.g. water, but it is simple to transport and to install as well as maintenance free.

This object has been achieved by providing a cover device for covering open liquid surfaces, such as ponds, lakes or pools, having a shell defining an inner cavity, and the inner cavity is to be filled at least partly with liquid, and the inner cavity is divided to at least two chambers by a separating means, and one of the chambers is provided by at least one opening formed in the shell~~.~~

~~Preferably a weight member is arranged in the proximity of said opening,~~ and said weight member is provided ~~by~~ with a through hole, and arranged in the opening of said shell.

The chamber is advantageously provided by at least one further opening formed in the shell.

The chamber is preferably provided by several further openings formed in the shell.

A cross section area of the openings formed in the shell are preferably different.

The opening is arranged in alignment with an axis of the device passing through the opening and the separating means, and a cross section area of an opening formed closer to the opening in the shell is smaller than a cross section area of an opening formed farther from the opening in the shell.

The device has a form substantially of a sphere, and the area of the separating means as measured perpendicularly to the axis is smaller than a greatest internal cross sectional area of any chamber as measured perpendicularly to the axis.

The separating means is hollow and being in fluid communication with chamber, and having an opening formed adjacent the chamber.

Preferably one way valves are arranged in at least one opening of the chamber.

The object above has also been achieved by providing a composite blanket formed on the surface of a storage reservoir containing liquid comprising several cover devices according to the invention in at least one layer formed by several cover devices according to the invention.

The cover device according to the invention will be disclosed in details as follows by referring to the accompanied drawings, wherein

Fig. 1 is a cross sectional view ~~of a preferred embodiment~~ of a self filling cover device ~~according to the present invention~~known from the prior art,

Fig. 2 is a cross sectional view of ~~another~~ a preferred embodiment of a self filling cover device according to the present invention,

Fig. 3 is a cross sectional view of a further preferred embodiment of a self filling cover device according to the present invention,

Fig. 4 is a cross sectional view of an advantageous embodiment of a self filling cover device according to the present invention,

Fig. 5 shows a further preferred embodiment of the invention (weight member not shown), and

Fig. 6 is a cross sectional view of layers formed by the devices according to the invention arranged on the surface of a pond filled with a liquid.

**Fig 1**. is a cross section of an exemplary self filling cover device 1 according to the ~~present invention~~prior art. The device 1 having a shape e.g. of a sphere or ball in this embodiment consists of a shell 2, the inner cavity of which is divided into two chambers 3,4 by a separating means 5, e.g a wall. Chamber 3 is sealed gas tightly in respect of the environment, and contains any gas, generally air. Chamber 4 contains air of environmental pressure, because of the presence of at least one opening 6 provided on the shell 2,

communicating with the inner cavity of the chamber 4. The shell 2 may preferably be made e.g. of UV stabilized High Density Polyethylene (HDPE) or any other suitable material, like PP or PVDF, thus, it may also be produced of many kinds of polymers or copolymers. For some other special applications the shell 2 of the device 1 can be produced as a composite by two or more kinds of material.

It is clear, that a device having such a structure floats on the surface of a liquid having a specific weight higher than the 'specific weight' of the whole structure of the device 1. When a device 1 ~~according to the invention~~ is situated on the surface of a liquid, the latter begins to penetrate into the inner cavity of chamber 4 through the opening 6 sooner or later, while the device 1 is rotating on the surface due to different environmental effects like wind blow or slight rippling of the surface of the liquid, and opening 6 approximates, then goes underneath the surface of the liquid allowing inflow thereof. It also is clear, however, that a weight member 8 fitted preferably in the proximity of the opening 6 results in tending the device 1 to get a position with the opening 6 below the surface of the liquid. The weight member 8 <u>according to the invention</u> ~~in this embodiment~~ is provided ~~by~~ <u>with</u> a through hole 8a and arranged in the opening 6 in order to achieve the best effect. Thus, the chamber 4 is filling with liquid up to a level when the internal pressure of the air in chamber 4 becomes equal to the pressure of water penetrating from beneath through the opening 6, and the device 1 starts to float with an axis A being substantially vertical or perpendicular to the surface of the liquid.

In order to accelerate above filling process and to make it less aleatory, and to increase the level of the liquid penetrating into chamber 4 for enhancing stability of the device 1, at least one further opening 7 can be arranged on

blanket on the surface of a storage reservoir containing liquid. It is clear however, that the geometrical shape of the device 1,11 can be other than a sphere or spheres separating by a stem 52, although the device has been disclosed by this shape but in an exemplary way only, e.g. a cube or an octahedron etc.

By means of the devices 1 according to the invention ~~disclosed above~~as defined by the appended claims, floating composite blankets can be formed on surfaces of ponds containing any liquid, providing a highly effective solution to difficult liquid storage problems e.g. in petrochemical and metal treatment industries. The term "composite" here refers to a trait of consisting of several cover devices 1,11. Although this blanket consists of several devices 1,11 according to the invention placed side by side on the liquid surface of a pond or a pool, they do not adrift into a limited surface area climbing up to each other, or be blown out from the pond or pool in case of strong or stormy winds, and do not require to be produced and transported in a state at least partly filled with a liquid, e.g. water, but it is simple to transport and to install as well as maintenance free. The device 1,11 according to the invention can be useful for removing oil, detergents and toxic pollutants of water. The device 1,11 can be applied by different activities of environmental protection such as controlling climate and aqueous biology by using of special sensors mounted on the device 1,11.

# Claims

1. Cover device for covering a surface of a liquid in a pond, having a shell (2) defining an inner cavity, and the inner cavity is to be filled at least partly with liquid, ~~***characterized in that***~~ wherein the inner cavity is divided in at least two chambers (3,4) by a separating means (5,51,52), and one of the chambers (4) is provided by at least one opening (6) formed in the shell (2), and~~.~~

~~2. Cover device according to claim 1, *characterized in that*~~ a weight member (8) is arranged in the proximity of said opening (6)~~.~~

~~3. Cover device according to claim 2~~, ***characterized in that*** said weight member (8) is provided ~~by~~ with a through hole (8a), and arranged in the opening (6) of said shell (2).

4~~2~~. Cover device according to claim ~~3~~1, ***characterized in that*** the chamber (4) is provided by at least one further opening (7) formed in the shell (2) of the chamber (4).

5~~3~~. Cover device according to claim 4~~2~~, ***characterized in that*** the chamber (4) is provided by several further openings (7) formed in the shell (2).

6~~4~~. Cover device according to claim 5~~3~~, ***characterized in that*** a cross section area of the openings (7) formed in the shell (2) are different.

7~~5~~. Cover device according to claim 6~~4~~, ***characterized in that*** the opening (6) is arranged in alignment with an axis (A) of the device (1) passing through the opening (6) and the separating means (5,51,52), and a cross section area of an opening (7) formed closer to the opening (6) in the shell (2) is smaller than a cross section area of an opening (7) formed farther from the opening (6) in the shell (2).

8~~6~~. Cover device according to claim 6~~5~~, ***characterized in that*** the device has a form substantially of a sphere, and the area of the separating means (51) as measured perpendicularly to the axis (A) is smaller than a greatest internal

cross sectional area of any chamber (3,4) as measured perpendicularly to the axis (A).

~~9~~7. Cover device according to claim ~~8~~6, ***characterized in that*** the separating means (52) is hollow and being in fluid communication with chamber (4), and having an opening (71) formed adjacent the chamber (3).

~~10~~8. Cover device according to claim ~~9~~7, ***characterized in that*** one way valves are arranged in at least one opening (6,7) of the chamber (4).

~~11~~9. A composite blanket formed on the surface of a storage reservoir containing liquid, ***characterized by*** consisting of several cover devices (1,11) according to any of preceding claims arranged in at least one layer.