(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 733 964 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
20.12.2006 Bulletin 2006/51

(51) Int Cl.:
B63B 35/34 *(2006.01)*

(21) Application number: **06012393.2**

(22) Date of filing: **16.06.2006**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(30) Priority: **17.06.2005 IT MI20051147**

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(54) Float module

(57) Composite floating structure which can be dismantled, comprising a pedestrian area (6) which is assembled in modules and rests solidly on modular units (1) which are connected to each other and float independently of each other, the said modular floating units (1) being suitable to create complex floating systems in liquids. The said modular units comprise a floating chamber (2) with a variable volume, filled with at least one fluid which has a specific weight inferior to that of the liquid in which the floating unit is immersed, and in which at least one wall (3) of the floating chamber itself is mobile and can be made up by the same surface of the liquid in which the unit is floating, or by a flexible (7), impermeable membrane which separates it from the said liquid, the other walls of the chamber being substantially impermeable both to the liquid and the fluid.

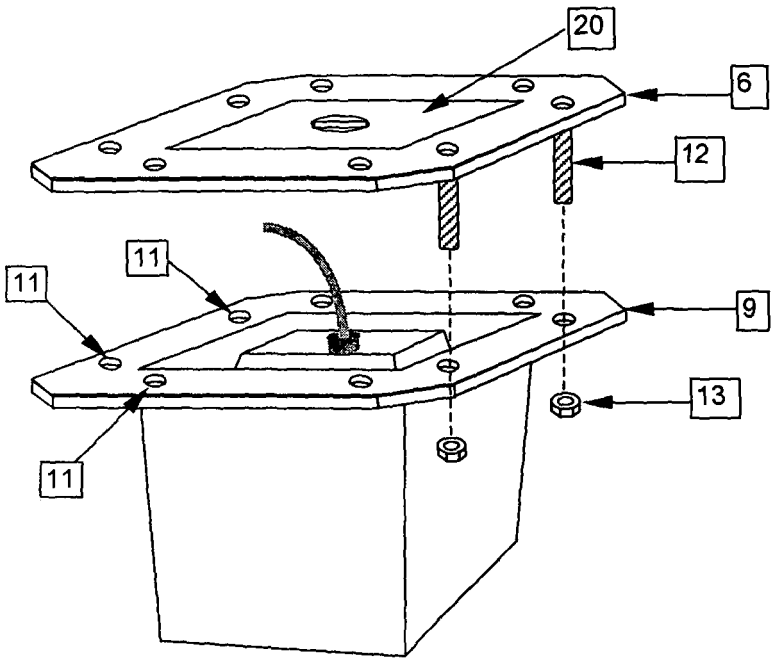

Fig.6

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Description

[0001] The present invention consists of composite modular structures, which float and are removable, in variable shapes and sizes, and can be positioned on areas of water to create floating surfaces for various types of activities or public events. In particular, the floating structures according to the present invention can be used as accessible areas by tradespeople who run cafés, restaurants, dance halls etc. positioned on the banks of rivers, or the shores of lakes or beaches, in order to extend their available space at specific times of the year, for use as platforms for bathing activities and, primarily, as wharfs for mooring small or medium pleasure boats.

[0002] In the following parts of the present description, reference will be made to the use of the said floating structures as wharfs in tourist ports for the mooring of small or medium boats. It is however obvious that their usage as mooring wharfs is only one of the uses of the floating structure of the present invention.

[0003] Wharfs for the mooring of boats in tourist ports are basically classed into two types: fixed and floating wharfs. Fixed wharfs are firmly anchored to the bed of the river/lake/sea to form a rigid structure, which is generally obtained by means of reinforced concrete poles on which the pedestrian areas of the wharf are then fixed.

[0004] Such structures are particularly expensive. Due to their intrinsic structure they offer no flexibility an cannot be adapted to the changing needs which may arise in tourist areas during the course of year. Furthermore, the use of fixed wharfs is practically excluded in tourist ports in which the water level may vary considerably, creating a difference in height between the wharf and the boat which makes it difficult to get on and off boats.

[0005] In order to get round these difficulties, floating wharfs have been proposed and produced, which generally consist of boxes of reinforced concrete which are anchored to the bank/shore by means mobile gangway sections.

[0006] Although these floating wharfs offer far greater flexibility of use than fixed wharfs and are not affected by even significant differences in the water level, their dimensions and weight are so great that their installation and dismantling, warehousing and disposal make them very expensive, with regard to transportation, time necessary for construction and installation, and the necessary paper work to obtain permission for their use. Their lack of flexibility also makes it difficult to comply with the ever-changing needs which arise in a tourist infrastructure.

[0007] In addition, there are substantial problems linked with disposing of such wharfs at the end of their usable lifetime, due both to their structure in concrete and also to the fact that they use highly polluting substances, such as expanded resins, particularly polystyrene, to guarantee buoyancy.

[0008] In the previous Italian patent number 1.284.069 (Inflatable floating supports) in the name of the present Applicant, a floating wharf is described, consisting of inflatable modular floating units with a surface area measuring up to 20 sq.mts. Unfortunately, although the solution described in the above-mentioned patent proved to be perfectly safe and reliable, it is not well accepted by users, if installed in particularly hostile surroundings, as in the case of floating wharfs anchored to beds of rivers/lakes/sea which are rocky and/or in moderate sea conditions, such as along rocky coastlines.

[0009] The Applicant has now found that all these difficulties could be minimised, if not eliminated, by means of a floating wharf consisting of an assembly of one or more floating supports, each support consisting of one floating, self-adjusting unit and connected to a suitable platform for the pedestrian area of the wharf - as the said unit would at least have a modular structure to ensure ease of assembly, dismantling, transportation and storage.

[0010] One embodiement of the present invention consists of a modular floating unit which can be easily installed over an area of water, to support a platform which can be used, for example, as a wharf for the mooring of small boats, and can be quickly dismantled for storage in reduced spaces or disposed of as ordinary waste at the end of its usable lifetime. In this regard, one specific advantage of the present invention lies in the fact that the above modular unit, as well as any complex construction which is created with the said units, uses only materials which can be recycled (metal, plastic and wood) or are environmentally friendly (air, water, sand), with regard to both the structure itself and its operation. A second advantageos embodiement of the present invention is a modular unit which can be used to create a floating support as defined above, that can be easily used in conjunction with similar units in order to modify the geometric structure of the mooring area of the floating wharf.

[0011] A further advantage of the present invention is a procedure which allows the quick and economic production of floating supports, as defined above, for use as wharfs for the mooring of small boats.

[0012] An additional advantage of the present invention concerns the production of a floating support for use as a mooring wharf which, in the event of violent storms or stormy seas, can be easily removed and then reassembled.

[0013] A further advantage of the present invention is a self-adjusting floating structure which can be adapted according to the conditions of use.

[0014] According to the present invention, the said floating structure contains modular floating units made in a substantially rigid material, which cannot be perforated accidentally.

[0015] In yet another advantageous embodiement, the present invention proposes a floating unit for modular assembly which is easy to handle and store in a limited space when not in use, in spite of being substantially rigid.

[0016] Furthermore, the present invention concerns a floating support composed of a modular floating unit, fit-

ted with devices which allow it to be solidly connected to other modular floating units and/or the bank or shore and covered with a platform, the top surface of which forms of a pedestrian area.

[0017] The modular floating unit has preferably small dimensions to allow easy handling and transportation. It is an advantage if the pedestrian area of a single floating support varies between one to just a few square meters. The pedestrian area may be made with any material which can bear the weight of people and equipment, and is resistant to physical damage and the effects of chemical agents in the surrounding environment. The choice of the size of the units will depend not only on the ease of handling and transportation, but also reduced storage space requirements. It may be constructed in metal, wood, synthetic materials or stone.

[0018] The present invention can be better understood from the following description of the particular production methods, which do not limit the framework of the invention itself, with reference to the enclosed diagrams, in which:

- diagram 1 represents a frontal section of a modular unit according to the invention in its first implementation method
- diagram 2 represents a frontal section of the modular unit of diagram 1, according to a variation of construction which involves a fluid-tight membrane as the base wall of the said unit;
- diagram 3 represents a frontal section of a modular unit according to the invention in a preferred implementation method
- diagram 4 shows a straight section view of the modular unit of diagram 3, complete with installation components;
- diagram 5 is a plan view of the pedestrian area of a wharf according to the invention, created by connecting a plurality of floating supports;
- diagram 6 is an exploded prospective view of the modular unit of diagram 3 with a corresponding type of platform;
- diagram 7a represents a detail of a first device for connecting the modular units together;
- diagram 7b represents a detail of a second device for connecting the modular units together;
- diagram 8 represents a plurality of modular floating units stacked together for storage of the said units.

[0019] In the diagrams, analogous units are indicated with identical number references.

[0020] In agreement with the present invention, the modular unit (diagram 1) which forms the basic floating unit of the structure according to the invention, is a hollow, substantially rigid body 1, with a truncated pyramid shape, in which the larger base is missing and the projection of the apex of the pyramid falls within the base of the latter. In the following part of the description, the inner volume 2 of the said truncated pyramid will be also defined as a chamber.

[0021] The geometric regularity of the pyramid and the number of sides are not essential for the purposes of manufacturing the present invention. The said pyramid could, for example, have circular bases, which define a truncated cone. The floating chamber consists substantially of portion 2 of the said hollow pyramid, which is truncated, immersed in liquid 3 with the greater base at the bottom, enclosing a volume of fluid, preferably a gas, even more preferably air, with a specific weight lower than that of the liquid in which the pyramid is immersed.

[0022] The lower wall of the floating chamber 2 is formed by the surface of liquid 3. In the case of pyramids which are immersed in water, the air bubble which remains inside the chamber 2 after immersion, is sufficient to guarantee buoyancy of the pyramid. Overturning of the pyramid is prevented by the fact that the pyramid is hooked, by means of standard devices 5, in a substantially solid way as will be seen, both to a platform 6 and to adjacent modular units.

[0023] The lower wall of the chamber, which may be moved by varying the quantity of liquid inside the chamber, makes it possible to modify the free inner volume of the chamber. This wall may be made, not only by means of the surface of the liquid in which the said pyramid is immersed, as said above, but also (diagram 2) with a shaped, flexible membrane 7, which is water-tight, elastic and solidly attached to the inner walls of the truncated pyramid to which it is appropriately attached.

[0024] In the particular implementation method here described and represented in the enclosed diagrams, the base of the pyramid is substantially square with a pyramid trunk height comparable to the side of the larger base, and in particular, with a preferred size which varies between 50 cm and 150 cm.

[0025] Dimensions may be modified according to the materials used, the characteristics of the pedestrian area of the platform and also the weight which the wharf has to bear.

[0026] In a preferred implementation method of the invention, the truncated pyramid 1 is solidly connected (diagram 3) to a second, homologous truncated pyramid 8, which contains pyramid 1, whose smaller base substantially corresponds to the larger base of pyramid 1, solidly connected to the said pyramid by means of a fluid-tight connection between the two said basis (respectively the larger and smaller base), which runs along the entire perimeter of the said bases.

[0027] The depth of the second pyramid 8 is basically comparable to the height of the first pyramid 1: in a particular implementation method of the invention the larger base of the outer pyramid 8 is substantially coplanar with the smaller base of the inner pyramid. The resulting structure is illustrated in diagram 3, whilst diagram 4 shows a straight section of this. As appears in diagram 4, the section comprises two V-shapes, which are symmetrically positioned in relation to the axis of the pyramids and connected to each other at the bottom.

[0028] Preferably, on the outside of the second pyramid, in correspondence with the larger base, an edge is present 9, which has the function of allowing the adjacent modular units to be coupled together, by means of a rigid or semi-elastic joint.

[0029] This edge, which preferably runs around the entire perimeter of the outer pyramid, allows the adjacent modular units to be coupled together, either directly or by means of a preferably semi-elastic joint 10, such as those shown in diagrams 7a and 7b.

[0030] For the purpose of carrying out the above coupling, the said edge (diagram 6) comprises a number of holes 11 in which bolts 12 can be placed and fixed with nuts 13. Alternatively, a different solution (not illustrated) in agreement with the present invention calls for attaching the bolts solidly to the edge, for example by welding or shrouding.

[0031] For the purpose of allowing a certain elasticity of the connection between the assembled modular units, the joints contain bearings 14, placed between pairs of edges which are joined together, in flexible material, mechanically resistant to the stress caused by the weight placed on the wharf and/or the wave motion of the area of water, on which the said wharf is floating, and chemically resistant to the aggression of environmental agents, such as the salinity of the water.

[0032] Such bearings are preferably made with elastometric materials in which natural and/or synthetic fibres are shrouded.

[0033] Diagram 7a shows a type of joint between two modular units placed side-by-side, comprising a double-C vertical girder 15, with the lower wing connected to edge 9 of the said modular units 8, by means of the interposition of the bearing 14, and with the upper wing connected to the platform of the wharf, possibly by means of the interposition of another bearing.

[0034] In diagram 7b, a variation of construction of the said joints is illustrated, which requires that the edge 9 of the modular unit no longer lies parallel but perpendicular in relation to the larger base of pyramid 8. In this construction method, the platform is connected to the pair of modular units by means of a T-shaped girder 16, which is positioned with the wing connected to the said platform. Any person skilled in the art will not have any difficulty in producing other devices for connecting the modular units to each other and for connecting the platforms of the wharf to the modular units, independently from the connection between the said modular units. Similarly, he/she will easily be able to prearrange other connecting devices 5 for the construction method of the modular unit illustrated in diagram 1.

[0035] Preferably, platform 6 should substantially have the same surface area as modular unit 8. However, the pedestrian area of the wharf comprises a plurality of platforms which might not correspond to the number of modular units used: in this case, several platforms will be directly connected with each other, but not with corresponding modular units. Diagram 5 illustrates, with a top view, a portion of the wharf made with six platforms (a1, a2, b1, b2, c1, c2) assembled together, of which only platforms a1, a2, c1 and c2 are connected with corresponding modular floating units.

[0036] Standard types of safety devices for people, such as side panels, hand rails, and railing may be anchored, in the standard way, to the pedestrian area of the wharf, likewise other devices for boats, such as camels which protrude outwards from the pedestrian area, bollards, cleats, turrets housing sockets for access to the electricity or water supply etc.

[0037] According to one embodiement of the present invention, each modular floating unit, is connected to a control device 21, and regulated by a control panel, not illustrated, which regulates the pressure of the fluid in the floating chamber of the modular units, which are connected to the said devices. The control devices of the single modular units can be connected to an overall control system for the entire structure (i.e. wharf).

[0038] This overall control system can intervene both on each single modular floating unit and, at the same time, on a group of units, if they are connected together, to create, for example, a wharf.

[0039] The volume control of the said fluid can be achieved, for example, by a set of valves 17, respectively inlet and outlet; preferably, the control of the opening/closing of the valves should be regulated with the technique used in the semiconductor memories, with just two parameters which address the lines (a, b, c) and the columns (1, 2,) of the ideal matrix which identifies the floating wharf.

[0040] A first parameter addresses the line and enables all the valves of that line to work and a second parameter addresses the column and enables all the valves of that column to work, whilst the two parameters command only the modular unit which is placed at the point in which the chosen column crosses with the chosen line, and therefore enables the unit to be commanded.

[0041] The control devices can be connected to the control panel using both conventional physical methods and also remotely, for example by means of radio signals.

[0042] The overall control system can be used to modify the overall buoyancy of the entire wharf or parts thereof, in the event of certain circumstances, such as a heavy loads, in which case greater pressure is provided, or the mooring of small boats, with the subsequent need to sink the structure to a greater extent, reducing the quantity of fluid in the chamber. The buoyancy control of the floating structure, at different points distributed over the structure itself, allows it to stay balanced, keeping it perfectly level and horizontal even in the case of a localised load applied far from the centre of mass of the structure itself. In the latter case, any conventional floating structure would in fact be thrown off balance and would assume a slanted position in relation to the water surface, whilst by acting on the different buoyancy forces of the single modules or groups of modules, the structure can be re-balanced regardless of the position or entity of the load.

[0043] The characteristic of being able to modify at will the height of the floating unit above the water level, resolves the problem of the current architectural barriers related to pleasure boating.

[0044] Persons with physical handicaps experience in fact great difficulty in overcoming the differences in height, which can be considerable, between the wharf itself and the side of a boat moored to the wharf. By modifying the waterline of the modular floating unit, it is possible to reduce or eliminate such differences in height, making it possible for even less fortunate people to get on and off boats easily.

[0045] For this purpose, according to a further variation of the invention proposed, the cavity 19 between the two truncated pyramids 1 and 8, is used as a stabilising element of the overall structure.

[0046] It is in fact possible to insert further valves 18 into the said cavity area: once open, these allow the cavity itself to be flooded. This, if appropriately balanced by the pressure control of the inner chamber, guarantees greater stability of the structure. The valves also allow the said cavity to be emptied, thus restoring or modifying the previous level of buoyancy.

[0047] It is alternatively possible to obtain the same, yet permanent stabilising effect, by using conformant material, i.e. a material which adapts its shape perfectly to that of the container which holds it (for example sand) and which, in many cases, has the additional advantage of being available in the location in which it is used. In addition it can be eliminated at the same time the wharf is dismantled. As an alternative, solidifiable materials such as self-expanding foams can also be used. Preferably, all the materials used in the structure according to the invention should be environmentally friendly, i.e. materials which can be disposed of without creating environmental pollution problems of any nature.

[0048] It is evident that the cavity 19 between the outermost truncated pyramid 8 and the innermost truncated pyramid 1, creates a useful service area, in which it is possible to place the above control devices, as well as valves, wires and tubes which serve to determine the behaviour of each single modular floating unit.

[0049] The said cavity may also form a further floating chamber, which can be created by sealing with a fluid-tight closure device the larger base of the truncated pyramid 8 (for example a rigid plate welded along the edges of the said base.)

[0050] The maintenance of the devices which are housed in the said cavity can be easily carried out by removing a tile 20, which is duly fitted to the said closure device, using a method similar to that used for elevated flooring for areas used as data centres. In diagram 6, the said closure device consists of the corresponding platform of the modular unit, assembled with the said unit by means of such devices as a gasket placed between edge 9 and platform 6, which ensure fluid-tightness. Preferably, the said platform comprises a continuous surface, even when this is not assembled with the modular unit with fluid-tight devices, with the purpose of preventing either rain water or water from waves which might flood the wharf, from penetrating the above cavity and causing uncontrolled variations of the buoyancy of the wharf.

[0051] It is also evident that, because of the particular structure of the modular units, if they have to be stored out of use (for example surplus units which are not required or for storage during the Winter season), they can be easily stacked together by using a method similar to that used by public establishments such as cafés, restaurants, theatres or religious buildings, for storing unused chairs, as shown in diagram 8.

[0052] The same storage method is also possible with the pedestrian area of the wharf, which is made up of a plurality of platforms 6, i.e. a plurality of modules similar to large tiles which can be easily stacked together. As a rule, the present description does not include the illustration of all the possible structural and dimensional alternatives with regard to the specifically described construction methods of the invention.

[0053] It is however understood that these variations are in any case included in the framework of protecting the present patent, as such alternative forms are themselves easy to identify from the description made here of the relationship between each implementation method and the desired result of the invention.

Claims

1. Modular floating unit to support floating structures with a pedestrian area, made by assembling together a number of platforms, comprising a hollow body (1), substantially rigid, fitted with devices (5) for hooking the said body to one of the said platforms, **characterised by** the fact that the said hollow body has a truncated pyramid shape, with the larger base at the bottom and the projection of the apex of the said pyramid falling within the base of the pyramid itself, cavity (2) of the said body forming a floating chamber with a variable volume, in which a wall of the said chamber is delimited by the surface of the liquid (3) in which it floats, the other walls of the said chamber being substantially impermeable, both to liquids and fluids.

2. Modular unit according to claim 1 **characterised by** the fact that the said wall, which is delimited by the surface of the liquid in which it floats, comprises a membrane (7) which is flexible and impermeable both to liquids and fluids, and is sealed along its edges to the other walls of the chamber to make it fluid-tight.

3. Modular unit according to claim 1, **characterised by** the fact that the said floating chamber (2) is connected to a device which controls the quantity of fluid present in the chamber itself.

4. Modular unit according to claim 1, **characterised by** the fact that the said floating chamber (2) is connected to a device which regulates the quantity of fluid in the chamber itself.

5. Modular unit according to claim 4, **characterised by** the fact that said device, by varying the quantity of fluid in the floating chamber, modifies the immersion level of the modular floating unit in the liquid.

6. Modular unit according to claim 5, **characterised by** the fact that the said controlling and regulating devices are inserted in an overall system which manages the buoyancy level of the wharf.

7. Modular unit according to claim 6, **characterised by** the fact that the said overall system regulates all the devices of the modular units which are connected to each other.

8. Modular unit according to claim 7, **characterised by** the fact that the said overall system regulates, on an independent basis, groups of controlling/regulating devices of the modular units.

9. Modular unit according to claim 1, **characterised by** the fact that the said truncated pyramid (1) is inserted in a second hollow body in the shape of a truncated pyramid (8), the lower base of which is substantially coplanar with the larger base of the said pyramid 1, the perimeter of the said lower base being fluid-tight and connected solidly to the perimeter of the larger base of the said truncated pyramid 1, the said two hollow bodies defining between them a cavity with variable volume (19) on the outside of the chamber (2).

10. Modular unit according to claim 9, **characterised by** the fact that the said cavity (19) is filled with fluid.

11. Modular unit according to claim 9, **characterised by** the fact that the said cavity (19) is filled with a solid material, the shape of which can be adapted to that of the cavity.

12. Modular unit according to claim 9, **characterised by** the fact that the said cavity (19) is filled with a solidifiable material.

13. Modular unit according to claim 9, **characterised by** the fact that the upper surface of the said second truncated pyramid (8) forms a platform (6) of the said wharf.

14. Modular unit according to claim 1, **characterised by** the fact that it has a shape which allows it to be stacked together with other similar modular units, in such a way that each of the said units (1) can be partially positioned into the inside of the relative floating chamber (2) of the adjacent modular unit.

15. Floating structure with pedestrian area comprising of a plurality of platforms (6) which are linked together, **characterised by** the fact that at least one of the said platforms is connected to a modular unit according to any one of the preceding claims.

16. Floating structure comprising at least one modular unit according to any one of the preceding claims, **characterised by** the fact that it uses only materials which can be recycled (metal, plastic and wood) or are environmentally friendly (air, water and sand), with regard to both the structure itself and its operation.

17. Method for the creation of floating structures in different shapes and sizes, which are removable and easily stored, **characterised by** the fact that stackable modular floating units are used, which can substantially be connected solidly to each other.

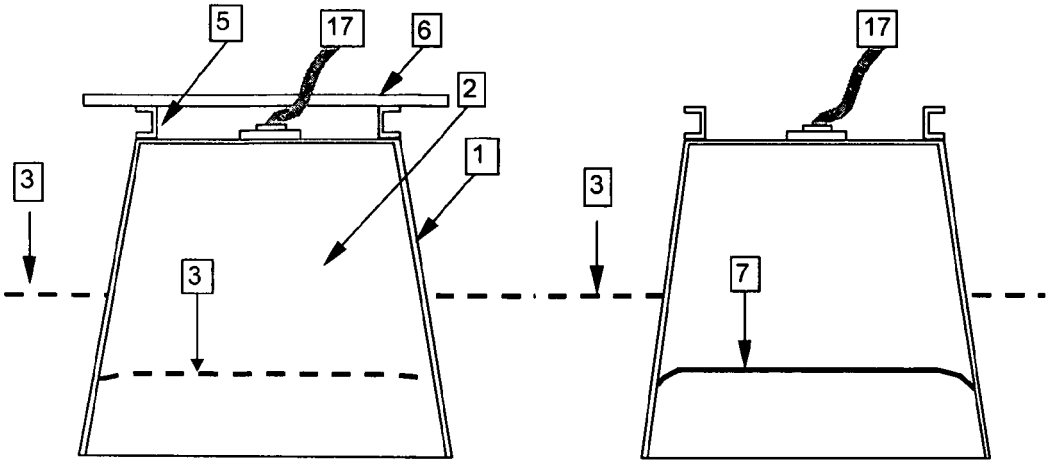

Fig.1

Fig.2

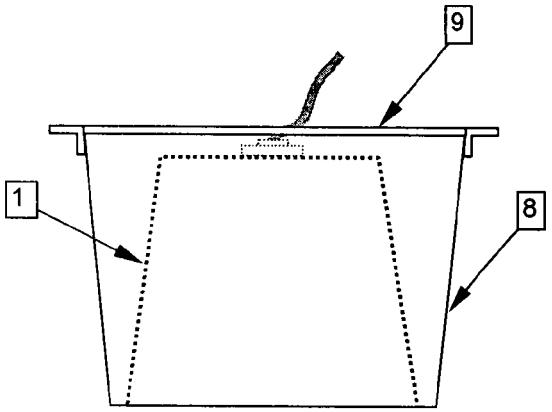

Fig.3

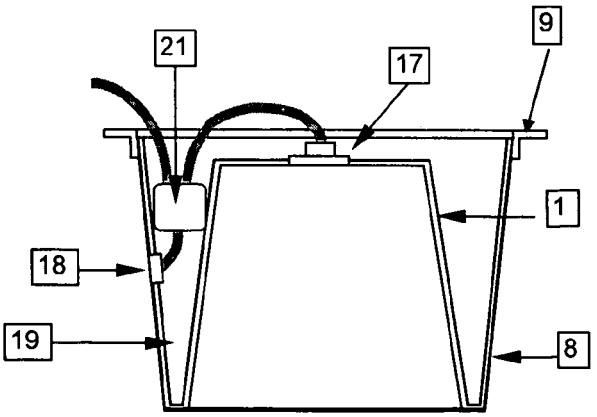

Fig.4

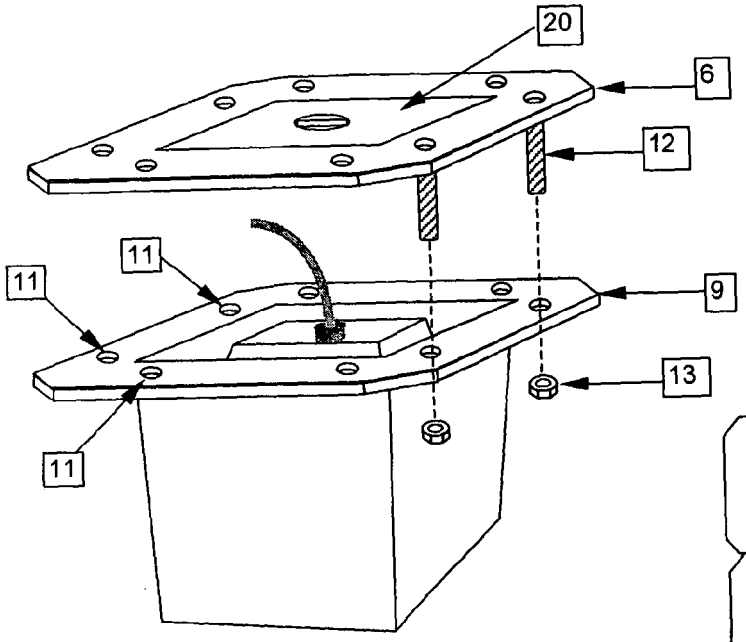

Fig.6

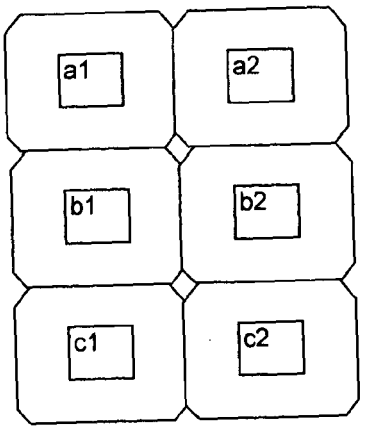

Fig.5

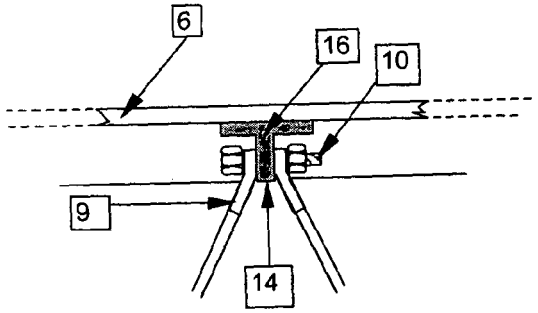

Fig.7b

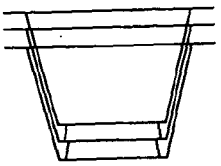

Fig.8

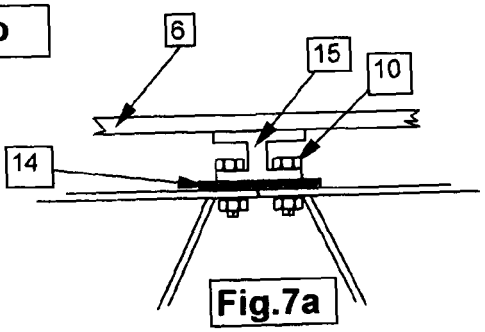

Fig.7a

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 01 2393

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	US 5 743 205 A (MORRIS RICHARD D [US]) 28 April 1998 (1998-04-28) * column 4, line 35 - line 63; figures 8,9 * -----	1,14-17 2-8	INV. B63B35/34
Y	US 6 021 730 A (CAREY II JAY F [US]) 8 February 2000 (2000-02-08) * column 15, line 30 - column 17, line 67; figures 6a-9a * -----	2-8	
A	WO 99/14110 A (OCEAN INNOVATIONS INC [US]) 25 March 1999 (1999-03-25) * abstract; figures * -----	1-17	
A	DE 101 51 079 A1 (GALKE STEFFEN [DE]) 27 March 2003 (2003-03-27) * paragraphs [0008], [0009] * -----	16	
A	US 3 073 271 A (BRILL EDWARD F) 15 January 1963 (1963-01-15) * figure 13 * -----	9,11-13	

TECHNICAL FIELDS SEARCHED (IPC)

B63B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	10 October 2006	Moya, Eduardo

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 06 01 2393

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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10-10-2006

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5743205 A	28-04-1998	CA 2138205 A1	17-06-1995
		US 5421282 A	06-06-1995
		US 5524549 A	11-06-1996
US 6021730 A	08-02-2000	NONE	
WO 9914110 A	25-03-1999	AT 252014 T	15-11-2003
		CA 2271572 A1	25-03-1999
		DE 69818969 D1	20-11-2003
		DE 69818969 T2	22-07-2004
		EP 0938426 A1	01-09-1999
		ES 2212336 T3	16-07-2004
		US 5931113 A	03-08-1999
DE 10151079 A1	27-03-2003	NONE	
US 3073271 A	15-01-1963	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- IT 1284069 **[0008]**