

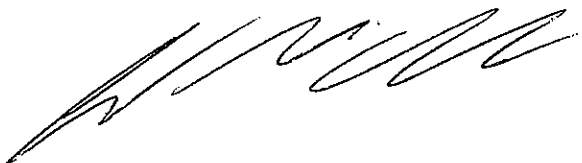
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WO 2004/096375 (PCT/CH04/000255), prepared by one of its translators competent in the art and conversant with the French and English languages, is a true and correct translation of the accompanying documents in English.

Signed this 3rd day of October 2005

For and on behalf of Thomson Scientific Limited:

A handwritten signature in black ink, appearing to read 'Bill McLelland', written in a cursive style.

Bill McLelland
Manager, Global Document Services
Thomson Scientific Limited

INFLATABLE STRUCTURE(S)

Inflatable structure(s) made up of tubes between which wide openings are left free. The surface area of these structures is created by increasing the number of elements constituting its members, crosses, corners, T-bars and bends, thereby creating a base module which can be used on its own. The module thus formed comprises, on the inner periphery of at least one of these openings or even all of these openings, a strip of fabric associated with attachment means, said strip of fabric being fixed to the tube at the height at which netting, canvas or accessories are to be fixed.

If desired, this surface may have a bridge added to it, on which it is possible to walk, this bridge being reproduced on any number of faces of the base module where it is desirable to increase the number of wide openings.

Document WO 01/06076 A1 forming part of the background art discloses an inflatable grille, all the openings of which are provided with open-work netting in which the openings can be unlocked, moved apart and re-locked and the grille may be used as a life raft in sports grounds and swimming pools. The fixing means used for the netting, as described on page 9, line 26, is not totally satisfactory in terms of securing the netting, and the eyelets are placed directly on the extension of the join of two superposed canvases, thus making the structure more fragile. Fig. 3.

SWIMMING POOL

This same document does not address the problem of weighting to enable the grille to be returned to the bottom of the swimming pool because it is necessary to weight the surface of the deflated tubes sitting flat on the water with heavier materials. Furthermore, because the grille is made up of sections, there is nothing to prevent anybody walking on it from putting his feet between the two tubes at a joining point when in the inflated and juxtaposed position.

Document FR 2 505 914 discloses a rigid frame around the edge of a swimming pool, over which netting is stretched to cover the entire swimming pool, and a float causes the frame to rise to the surface. The rigidity constitutes a problem because a frame of this design bends when subjected to load.

On page 9, publication WO 03/015046 talks of an extendable frame located on the periphery of the grille, which is used to tauten the netting. The frame is moved so that it sits underneath

the tubes, positioned along the axis thereof, which leaves a gap of 15 to 20cm between the frame and the edge of the swimming pool, depending on the diameter of the tube, so that a limb, arm or foot can become trapped between the frame and the edge of the swimming pool as it is being raised.

5 LIFE RAFT

Document DE32 10590 A1 discloses a life raft made up of units attached by hooks. It is not possible to walk on the joining point between two surfaces because of the way the surfaces are joined. Document WO02/079027 discloses a reversible life raft consisting of a single unit.

10 SPORTS GROUND

For applications involving sports grounds, the prior art discloses aquatic trampolines and these trampolines generally comprise an air chamber with a centre opening over which is placed a canvas, on which it is possible to jump and rebound because springs or elastic ropes or both are used as the fixing systems and mounted on a rigid tube, as is the case described in documents US 5,810,695, US 6,508,682. These are essentially designed to enable jumping on the single canvas or belt, and rapid mounting and dismantling of the rebound canvas so as to allow other activities is not envisaged. Document US6,223,673 discloses a trampoline to which an access ramp and two joined tubes can be fitted to form a slide. This system is designed so that it is possible to jump on the belt and the access ramp is used for mounting and dismantling the trampoline and the slide is used to get down from it. These trampolines are limited in terms of the possible activities for which they can be used and are not designed for sports other than trampolining or games which involve getting on and off the trampoline.

In the case of the inflatable structure described in this instance, it is the structure itself which reacts, whereas in the case of standard trampolines the structure is rendered rigid by tubing and it is the tension on the elastic ropes and/or springs which causes the rebound. This inflatable structure also enables a base surface for multiple games to be created, wherein rapid mounting and dismantling of netting, canvas and accessories is possible, which surface can be added to on each of its sides by virtue of a bridge.

25 APPLICATIONS IN SNOW

Document US 4,894,033 discloses an inflatable mattress which can be used on snow. Although the oarlocks illustrated in Fig.9 and guide elements 22 depicted in Fig. 2 enable the

mattress to be guided, there are no means of braking given the position of the body imposed by the shape.

Document US 4,206,933 discloses a sled with a triangular-shaped inflatable structure but which is difficult to manoeuvre round corners during travel.

5 The aim of the invention is therefore to provide a polyvalent inflatable structure which can remedy these drawbacks and disadvantages in each field of application. The invention is defined by the combination of features of claim 1 and the subsequent claims.

10 The objective of the present invention is to overcome these disadvantages and this will be more readily understood from the description of the appended drawings showing different embodiments, which are given by way of example but not intended to be restrictive.

Figure 1 : illustrates an inflatable structure 1, in the shape of a cross 2 with corners, in this particular case right-angled corners 3, T-bars 4 and openings 5, with handles 15 and an inflation/deflation valve 19.

15 Figure 2 : depicts a strip of fabric 10 with eyelets 7, the strip of fabric being folded back on itself to form four sections 6, of which two sections (separated in the drawing for illustrative purposes), on a level with the fold, are joined or bonded 33, fixing means, in this case eyelets 7, being fixed to this part spaced at regular intervals apart, whilst the other two sections, which are opened out and folded back, are placed on the tube 8 to which they are fixed by bonding, the
20 eyelets then being covered with a strip of fabric 49.

Figure 3 : illustrates how two structures 1 are joined, the bridge 9 of which is formed by two superposed strips of fabric 59, each having eyelets 7, which strip is fixed, bonded or heat-welded on either side of two tubes 8 to be joined, a rope 11 being threaded through the eyelets 7 and secured by a knot 12. A strip of fabric
25 49 protects the ropes (not visible here).

Figure 4a : depicts a rope 11, folded back on itself to form loops 60.

Figure 4b : illustrates a section through a tube 8 which will be used to form the bridge, by means of a wide strip of fabric with eyelets 13, fixed so that it straddles the rope 11, the arrangement of which underneath the fabric is indicated by a broken line, the rope 11 being pulled through the eyelets to form loops 60.
30

Figure 4c : shows the join between two structures 1, where a strip of fabric 13a with eyelets 7 for forming the bridge 9 covers the wide strip of fabric with eyelets 13b through which the rope 11 is pulled. The rope 11 is pulled through the eyelets 7 forming loops 60. A strip of fabric 49 covers this rope 11 and a knot 12 is tied at the end of the bridge.

Figure 4d : illustrates a rope 11 forming loops 60. The rope is disposed along the netting 18 and the loops are held by a ring 50 at their base.

Figure 4e : illustrates the tube 8, the strip of fabric 10 with eyelets 7 and a different method of assembly, in this case the rope 11 which is fixed to the netting 18; the loops 60 of the rope 11, pulled through the eyelets 7, are threaded one in the other and then pulled across to the left so as to fix them, the lacing being covered by a strip of fabric.

Figure 4 f : depicts a section through the structure 1 and another method of assembling a bridge: two wide strips of fabric 13 with eyelets 7 and a rope 11 threaded through in a zigzag pattern to assemble them. An additional strip of fabric 49 is fixed at one side to one of the strips of fabric 13 with eyelets 7 covering the entire length, the rope 11 being secured by a knot 12.

Figure 4 g : illustrates another method of assembling a bridge, this time consisting of miniature mooring bitts mounted on a strip of rubber 66 for example, which strip thus formed is fixed to a strip of fabric 67 on each of the structures. A strip of fabric 49 which is folded down is fixed to each structure so that it covers each of the strips with the mooring bitts 66 and the rope 11, which ends the lacing with a knot 12.

Figure 5 : illustrates a section through one tube 8, provided with a fabric strip 10 with eyelets 7 and an accessory, in this case a rope 11, and with a knot 12 at the end of the rope.

Figure 6 : illustrates a section through one tube 8, provided with a fabric strip 10 with eyelets 7 and an accessory, in this case a foot rest 16 with a protective strip of fabric 49.

Figure 7 : depicts the fabric strip 10 with eyelets 7, which is fixed to the tube 8, and double-ended hooks 17 for fixing the netting 18, the hooks 17 being covered by a strip of fabric 49. A reinforcing seam 65 can be seen in broken line.

Figure 8 : illustrates a tube 8, made in the form of an inflatable mattress with internal reinforcements 57. The strip of fabric 10 with eyelets 7 can be seen, as well as a fixed strip of fabric 49 to protect hooks or rope and, on the left-hand side, a strip of fabric attached to a seam 58, with an eyelet 7 and a handle 15.

5 Figure 9 : is a schematic illustration of a module made up of four rectangles, two of which rectangles are provided with a strip of fabric 10 with eyelets 7, the netting 18 with double-ended hooks 17 and a protective strip 49 which covers them in the cross-section shown here, and two of the openings 5 are left empty. One of the sides has handles 15, an inflation/deflation valve 19: a wide strip of fabric 13 covers a rope 11 pulled through the eyelets 7 to form loops 60. A
10 fabric strip 49, shown here in cross-section, is provided as an extension of the strip of fabric 13, which folds down to cover the rope 11.

Figure 10 : is a schematic diagram illustrating an example of a base module consisting of six elements with netting 18, a protective strip of fabric 49 shown in bold line,
15 and handles 15.

Figure 11 : shows a module comprising twelve elements with handles 15, this module having two elements provided with netting 18 and a protective strip 49 and four elements with fabric strips 10 with eyelets 7 and a protective strip 49,
20 shown here in bold line, for attaching either accessories or detachable netting or canvas, and six empty elements 5 which do not have a fabric strip with eyelets. The means used to fix the netting are not visible in this case.

Figure 12 : is a schematic diagram illustrating an example of a different type of module made up of hexagons 21 which can be nested with another module of the same dimensions 21, and showing the handles 15, four of the openings being
25 provided with netting 18. The bridges are fixed between the two structures A and B by means of a wide strip with eyelets 13a fixed to the structure A, with structure B having a strip of fabric 13b with eyelets 7 through which the rope is pulled to form loops 60. Each of the structures A and B has an additional side with a strip of fabric with eyelets 13, ready to receive another module.

30 Figure 13 : illustrates the second grille, being a metal grille 69, which is disposed in the pool and will conform to the shape of the inflatable structure and the pool for

use as a weighting means, the grille being made up of bars 22 which are secured in T-bars 23, crosses 24, and corners 25.

Figure 14a : illustrates a tube 8 in cross section with a length of fabric strip 26 attached to the tube to support the metal grille.

5 Figure 14b : depicts a tube 8 in cross section with the fabric strip being used as a support 26 for the metal grille 26 and shows a section of metal bar 22 and the wall of the swimming pool 27.

10 Figure 15 : shows a toboggan made up of two tubes 8 joined at an acute angle, a cross-piece 28. It is possible to see the netting 18, two handles 15, an inflation/deflation valve 19, a flexible and articulated and height-adjustable rudder shaft 30 with handle bar 31 and the strip of fabric with eyelets 10 which is shown in broken line.

15 Figure 16 : shows a toboggan or bob made up of two tubes 8, this bob having two compartments, one of which has a netting 18, with two cross-pieces 28, handles 15, safety belts 29, two foot rests 71 shown here by two bold lines, a flexible and articulated and height-adjustable rudder shaft 30 with a handle bar 31 and an inflation/deflation valve 19, the fabric strip with eyelets 10 being shown here in broken line.

20 Figure 17a: illustrates the rudder and brake system, comprising a height-adjustable tubular shaft 30 and showing orifices 34 on either side of the tubular shaft, a metal rod 35 which is inserted through the tubular shaft and sits freely on the transverse bar 32 holding the unit at a certain height and enabling the rudder to pivot. Also illustrated, underneath the transverse bar 32 and on each side, is a
25 respective rod 40, these rods nesting in female mounting and fixing means 41 provided on the inner sides of the tubes, see Fig. 17b. Also illustrated is the plate which acts as braking means 36, linked to the tubular shaft 33 by springs or elastic elements, in this case elastic bars 37, these elastic bars being attached to hooks 38, whilst the plate 36 has a foot rest 44 and a part 39 which brushes against the ground for guidance purposes. The tube is indicated by broken
30 lines.

Figure 17b : illustrates a female mounting piece 41 for the rods 40 illustrated in Fig.17a.

- Figure 18a : illustrates another embodiment of the rudder and brake system, comprising a Z-shaped strip of flexible material 46 secured between two plates 36, a foot rest 44 shown in section, the part which brushes against the ground 39, and also showing the tubular shaft 30 and a foot 20, a broken line showing the ground 45.
- Figure 18b : shows the top brake plate 36 with three points of attachment, in this case hooks 38, for elastic elements or springs, in this instance large elastic elements 37, which hook into the hooks 38 provided on the tubes at the desired level but not illustrated here.
- Figure 19 : illustrates a tarpaulin mounted on a board with rollers 42, straps 43 and handles 15.
- Figure 20 : depicts an inflatable structure 1 with weighted netting 47 attached to the bottom part of the inflatable structure, the fixing means 48 thereof underneath the structure and shown by broken lines and the netting 18. It is possible to see the open-work arrangement which can be unlocked, moved apart and re-locked 14. The protective strips on the means used to fix the netting are not visible here.
- Figure 21a and b: each illustrate a section of the double-ended hook 17 used to attach the netting. The narrower part locates in the eyelet and the wider part engages around the edge of the netting. Arrow A indicates the traction force on the eyelet and arrow B that exerted on the netting when jumped on.
- Figure 21c : illustrates a section of another design of double-ended hook 17 used to link two fabric strips 10 with eyelets 7. Arrow A denotes the traction force on the eyelet and arrow B that exerted on the netting or canvas when jumped on.
- La figure 22 : shows a means for sealing the structure for aquatic use. There can be seen the strip of fabric 10 with eyelets 7 attached to the tube 8 and a strip of fabric with eyelets 10b to support the canvas, not illustrated here. The two strips of fabric 10 with eyelets 7 and 10b are assembled by means of a rope 11. This is covered by another strip of fabric 54 bonded at the edge of the strip of fabric with eyelets 10 b to cover the fabric strip 10 with eyelets 7 and fixed to the tube 8 by means of a series of button-holes 52 in the fabric strip 54 and in the tube 8, the buttons being mounted on a strip 53, the fabric strip 54 being

provided with a part which acts as a sucker 51, shown here by a bold line. The strip of fabric 54 is folded back in the direction of the arrow when the canvas is fitted.

Figure 23 : shows an adjustable, flexible and articulated rudder shaft 30 which is fixed directly to a plank 36 for steering, using the arms, either in a standing or seated position.

Figure 24 : depicts an example of a support 55 for the rudder and brake system and shows a piece with a volume and shape designed to match the inside front part of the tube 8 constituting the toboggan, this volume incorporating a tubular part 56 for receiving the rudder shaft 30, this volume being flat at the top and the transverse bar 35 inserted through the tubular shaft 30 being seated on this flat region 57.

Figure 25 : illustrates a mounting bridge for volley-ball consisting of a plank 61, which slides respectively onto each tube at either side through hems 62 provided on the bridge. Attached to the plank 61 is a tubular receiving part 63 into which the post that will hold the net is slotted. Grommets in the form of D-shaped rings 64 are provided on the tubes 8 in order to stabilise the netting or post by means of laces, not illustrated. A strip of fabric which can be folded back 49 covers the D-shaped rings 64.

Figure 26 : shows an example of the means for fixing the netting 18, by means of miniature mooring bitts 66 mounted on a strip of fabric 10 and loops 70 on the netting.

Various examples will now be described to illustrate various design options for the inflatable structure, although these are given by way of illustration only and not intended to be restrictive.

- For example, a base module comprising twelve openings, in this case rectangular, six of which openings 5 do not have strips of fabric with eyelets, four openings having strips of fabric 10 with eyelets 7 covered with protective strips 49, and two openings having netting 18. Fig. 11.

- One variant would be the same structure with a strip of fabric 10 and eyelets 7 provided with a protective strip of fabric 49, ready to receive the netting and accessories in all the openings 5.

5 - One variation might be one in which all the openings of the structure were provided with a strip of fabric 10 with eyelets 7, a protective strip 49 and netting 18. Fig. 10, Fig. 20.

- Another variant is a module with no strip of fabric 10 with eyelets 7.

Each module can be used on its own and a bridge 9 is created on each of the sides where it is desired to add another surface.

DETACHABLE NETTING

10 The netting 18 is detachably fixed in position by a simple system of fixing means. See Figs. 4d - 4e, Fig. 7. The detachable fixing means for the netting might be double-ended hooks 17, tap-in but non-collapsible hooks, clip hooks, ropes 11, loops 70, Fig. 26, hems for rope, this list not being limiting.

15 The method of fixing the netting illustrated in Figs. 4d and 4e is particularly quick. Once the length of the loop has been defined, this can be fixed to the base by adhesive or by a ring for example, the loop is then passed into an eyelet and pulled to the left and the next loop passes into this loop and is pulled to the left, and so on. With a rope end left hanging at each end, the two rope ends merely have to be attached together in the corners to fix the netting or canvas.

20 Dismantling of the system is equally as rapid. The same applies to the system illustrated in Fig. 4g.

OPENINGS, WHICH MAY OR MAY NOT BE PROVIDED WITH NETTING

25 The fact of fixing a fabric strip 10 with fixing means and a protective strip 49 with accessories such as rope 11 or foot rest 16 for example, Figs. 5, 6, in some openings 5 or in all the openings 5 creates a new effect and allows use thereof both in aquatic environments and on a beach or soft ground so as to develop ball games, games requiring dexterity, racing, physical exercises and any number of activities imaginable to be organised.

The structure can therefore be set up in the form of a chequer board, which might incorporate a single block or consist of several blocks linked by a bridge, dimensioned to match the size of a volleyball court or more.

5 **FABRIC STRIP ASSOCIATED WITH FIXING MEANS**

This strip of fabric 10 with eyelets 7 or fixing means consists of a long strip of fabric folded in two in the lengthwise direction and is joined, for example bonded 33, across approximately one third to one half starting from said fold, this part having eyelets 7 or fixing means, hooks, mooring bitts or hems for rope for example fixed across the entire length of the strip. The non-welded or non-bonded part 33 is separated into two parts and opened out and can then be fixed or bonded onto the tube 8 as in Fig. 2. A protective strip of fabric 49 is bonded onto this strip of fabric 10 at the fixing means, and is left free and covers the fixing means and ropes. Depending on the solidity of the materials used, the strip of fabric 10 will be reinforced for example by at least one seam 65 at the fixing means, Fig. 7. The seam is formed either on the strip of fabric 10 or on the protective strip 49. If the protective strip 49 is not heavy enough to cover the ropes, it will be fixed to the netting or canvas by some attachment means for example. This applies to any type of structure, swimming pool, life raft, sports ground, toboggan.

If necessary, depending on the tensions and tractions on the tubes which the strip of fabric 10 will have to withstand, it will be covered on its upper and lower part by a strip of fabric bonded at its edge to the tube and covering the strip of fabric 10 over a few centimetres.

This strip of fabric 10 with eyelets 7 or fixing means may be used both around the inner periphery of the structure for accessories such as foot rests for example for the netting or canvas 18 and on the exterior, below the structure, as a means of fitting the weighted netting 47 using ropes or hooks. Figs. 2, 4 e, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 20, 22, 26. Depending on the size of the tubes and the selected activities, the same strip of fabric 10 with fixing means and protective strip 49 is fixed at a number of desired heights, thereby increasing the possibilities for use.

Note: it is the diameter ratio of the tubes, surface of the netting or canvas and height position of the netting or canvas which determine the contact with water or ground and the use thereof for safety or play purposes.

By using welding technology at high ultrasonic frequencies, the fabric strip 10 with eyelets 7 may be made in two parts, which are then grafted at a seam, and handles, accessories, ropes, ladders, eyelets and fixing means can be attached to this strip as desired. Fig. 8.

PROTRUDING ELEMENTS

- 5 For safety reasons, any detachable protruding elements on the top of the structure which may cause injury to the human body, such as (semi-circular) D-shaped rings 64 or grommets for example, will also be covered by a protective strip 49 or by another protective means such as blocks made of foam, cork or rubber for the volleyball posts. Fig. 25.

NETTING AND FIXING MEANS

- 10 The netting or canvas 18 itself for example may be cut so as to be quite free or, for greater firmness, can be edged with whipping, a rope 11, rope with loops 60 which are interlaced in the eyelets 7 in the strip of fabric 10, Fig. 4a, 4d, 4e; loops 70 which can hook over the miniature mooring bitts 66 or hooks on the strip of fabric 10, Fig. 26; a hem or another strip of fabric 10 with eyelets 7, Fig. 22; or other fixing means, double-ended hooks 17, Figs. 7, 15 21 a, b, c, elastic ropes for example.

The fixing means on the strip of fabric 10 are, for example: hooks in the form of mooring bitts mounted on a strip 66 or directly on the strip of fabric 10, eyelets 7, Figs. 2, 7, 26, which make it possible to attach the netting, canvas, accessories, foot rest for example, Fig. 6.

POSTS FOR VOLLEY BALL

- 20 On each side of the bridge, left and right, a plank 61 slides in hems or pockets 62 provided for this purpose, above whichever system has been chosen to fix the bridge. At the middle of this plank is a tubular part 63 in which the post that will be used to mount the net is screwed or nested. The grommets, in this case D-shaped rings 64, will be disposed on the structure at the sides of the tubes 8 to enable the posts and net to be stabilised by laces, and the D-shaped rings can be covered by a fabric strip 49 which is folded over, Fig. 24. Variant: flag-holders in the form of cones, which are bonded either directly to the structure if it is made in one piece or to a plank 61, this not being limiting in nature.
- 25

INFLATION / DEFLATION SAFETY

- Each structure is fitted with at least one inflation/deflation valve 19 which corresponds to an air chamber, each valve supplying an internal section of the structure which is separated by a wall placed in the desired location.
- 30

When the structure is used to create a closed environment or far from a shore, particularly in respect of sports grounds, it comprises an open-work arrangement in its netting or canvas which can be unlocked, moved apart and re-locked. Fig. 20.

5 In the case of independent sports facilities or for covers for swimming pools independently of a life raft, an inflation device of the type used as standard in nautical applications or a pneumatic aspirator with inverted functions may be used for inflation/deflation purposes.

LIFE RAFT

10 In the case where an open-work arrangement which can be moved apart, unlocked and re-locked is made watertight by any means whatsoever, such as a watertight zip fastener for example, the netting is replaced with watertight fabric canvas on which the open-work arrangement which can be moved apart, unlocked and locked will be formed. This canvas will be fixed either directly to the tube with a protective strip which is bonded or welded to the tube and covers the part of the canvas that is fixed to the tube, or the canvas will be bonded or welded to the strip of fabric 10, which will be fixed at the desired height, it being possible for 15 these fixing means to be applied to the toboggan.

The bag will then comprise either only a shelter or tent, or a shelter or tent with a floor and means for fixing it to the ground, depending on the intended use.

PRESSURE-RELIEF VALVE

20 Depending on the application, in addition to an inflation/deflation valve, a pressure-relief valve may also be provided, thereby enabling air to escape in the event of violent shocks, without bursting the tubes.

TRANSPORT

For this purpose, the base module has ropes 11 and handles 15 around its periphery. These may also be used for all other applications.

25 In the deflated state, on the other hand, the module is carried by means of a tarpaulin with straps and handles 15 attached to the exterior of the tarpaulin, the entire unit being placed on a board with rollers. Another solution would be to make a cover in the form of a large suitcase or box, mounted on a board with rollers 42, with a locking system, zip fastener or straps 43 and/or handles 15.

30 **BRIDGE**

A bridge 9 may be created for use in swimming pools, sports facilities or with life rafts. The join between two surfaces must impart a certain rigidity to the unit because the bridge 9, by whatever means it is created, is designed to prevent the feet being placed between two tubes 8 when moving on the flat or jumping between the tubes 8. Figs. 3, 4c, 4f, 4g.

- 5 Two modules can be attached by threading a rope 11 through the handles 15, although the bridge should be created by attaching:

Solutions a and b: a fabric strip 13 with eyelets 7, left free and fixed at one side to a tube and, facing it, to the other structure, a fabric strip 13 straddling the rope which passes through the eyelets 7 in loops 60. Fig. 4 a, 4 b, 4 c.

- 10 Solutions b and c: two fabric strips 10 with eyelets 7, attached to either side of the tubes to be assembled, being either two strips 59 placed one on top of the other with a rope threaded above and below the two fabric strips, as illustrated in Fig. 3, or two fabric strips with eyelets 13, which are placed edge to edge, and a rope 11 is passed through them in a zigzag arrangement to assemble them, as illustrated in Fig. 4 f.

- 15 Solution d : two sets of mooring bitts 66, each on a fabric strip 67 attached to each tube to be assembled, with a rope threaded through from one bitt to the other, as illustrated in Fig. 4 g.

In all the situations illustrated in the drawings, a fabric strip 49 will be attached to one of the fabric strips 10 and will be used to cover the fixing means. This fabric strip 49 is folded down when the rope has been fitted.

- 20 To ensure that the tubes 8 sit in contact with one another when assembled, it is useful to arrange the handles 15 offset from one another from one module to the next.

WEIGHTING THE STRUCTURE FOR SWIMMING POOLS

- 25 For applications which involve use with a lifesaving device in swimming pools, one solution for weighting the grille is to provide not just one grille but also a second grille made from metal disposed underneath the inflatable structure. The grille will have connectors, corners 25, T-bars 23 and crosses 24 to enable it to be assembled/dismantled on site, and is attached to the inflatable structure by fabric strips 26 into which the posts or bars 22 slide. The outer periphery of this second grille will be fixed so that this grille is as close as possible to the edges of the swimming pool. Fig. 13, 14a, 14b.

Enclosed in its fabric casing, this metal grille will either sit on the base of the swimming pool when the inflatable grille is deflated or can be embedded in the base of the swimming pool, where the imprint of its contour is reproduced.

STOP

- 5 To prevent the metal grille from knocking against the walls of the swimming pool, it will be necessary to provide protective elements or strips made of rubber 68 to avoid friction. As a variant, stop elements will be secured either at susceptible areas around the periphery of the grille or on the walls of the swimming pool.

INTERNAL ACCESS TO THE STRUCTURE

- 10 To install the air distribution network with access to the structure from inside, sealed traps are attached to the crosses, T-bars or corners when the lifesaving device is put in place.

PROHIBITED ACCESS / SAFETY

- 15 If it is necessary to prevent swimming underneath the structure or for sports facilities located in the middle of a swimming pool or on a stretch of water with other areas extending off from it, it is necessary to fit fixing means positioned around the bottom periphery of the structure, on which the weighted netting 47 can be hooked around the entire periphery, which weighted netting 47 will sink to the bottom preventing access to this area. The means which might be used for this purpose include grommets with a rope passing around the structure, D-shaped rings, i.e. semi-circular rings, or loops attached at regular intervals to the bottom periphery of the defined surface, for example. Hooks or small clips might be used to fit the netting, although this option is not restrictive. The weighting may be provided for example by means of a strip containing lead and encased in insulating material, Fig. 20, or weights.
- 20

STABILISATION

- 25 These sports facilities in aquatic environments, swimming pools, lakes, sea, are stabilised by means of ropes or deadmen to ensure that they are sound.

REINFORCING TAPE

- 30 If the structure is likely to come into contact with friction, feet, rough ground or elements or the walls of the swimming pool, regardless of the application, it is advisable to fit reinforcing tape made of rubber 68 or some other material which can be attached to the fabric used for the tubes, and this can be done at any point which might be susceptible to wear, be it on the sides, underneath or on the top, Fig. 16.

SEAMS

If the tubes are made using a technology based on cold-bonding, or a hybrid technique, the internal and external seams will be reinforced with narrow fabric strips to ensure a perfect seal.

5 REINFORCING THE INFLATABLE STRUCTURE

If high-frequency ultrasonic heat welding technology is used, the structure of inflatable tubes is reinforced by incorporating tubular elements 57, such as used on inflatable mattresses. The fabric strips 10 with eyelets 7 or fabric strip used to form handles will then be attached to a reinforcement, provided as an extension of the seams 58, as illustrated in Fig. 8.

10 SNOW / WATER APPLICATIONS

A boat-shaped structure has reinforcement strips underneath and on the sides where there could be some risk of friction; one or more cross-pieces 28 for the canvas or the netting 18 attached to a fabric strip 10 with eyelets 7 by means of a rope 11 or double-ended hooks 17, or by means of two strips of mooring bitts and a rope, and the structure is also provided with
15 handles 15, safety belts 29, with a rudder and brake system, and then becomes a toboggan or bob for travelling down and climbing snow-covered slopes. The brake and rudder system as well as the motor, mounted at the rear, are optional detachable features. The advantages of this are that the bob can be dismantled and deflated, takes up little space, can be folded and stored in a bag and the tubes provide protection. A user can sit either on the canvas or on the
20 cross-pieces and, for additional comfort, an elastic netting may be fixed along a cross-piece for carrying luggage and foot rests may be secured or bonded to the inner side on either side of the tubes, for steering either in a standing or seated position. Fig.15, 16, 17a, 17b, 18a, 18b.

In summer, it can be used on water, with a motor fixed to the rear and with oars. Edged with eyelets 7, the canvas will be rendered watertight in the following way, for example: a strip of
25 fabric 54 is attached to the periphery adjacent to the fabric strip with eyelets 10b so as to cover them and is applied by forming the corner and running it up onto the tubes, where it is fixed by a series of button-holes 52 which are formed in the strip of fabric 54 and hook onto the tube 8 where a series of buttons 53 are mounted on a strip of rubber. The strip of fabric 54 comprises a strip which acts as a sucker 51. Fig. 22. The fabric strip 54 folds back to enable
30 the canvas to be attached.

As a variant, the buttons may be flat hooks. Another solution: a watertight zip fastener attached to the tube at one side and to the fabric strip with the canvas at the other side. These solutions are not intended to be restrictive.

RUDDER - BRAKE SYSTEM

5 It consists for example of an articulated and flexible tubular shaft or rudder shaft 30 with a handle bar 31, the height of which can be adjusted. Its height position is locked by a metal rod 35 inserted through orifices 34 provided on the rudder shaft 30. Fig. 17a.

10 The tubular shaft 33 freely engages in a transverse bar 32, which bar may or may not be extendible in width and has on its bottom part and at each end, left and right, a rod 40, which may or may not be threaded, each of these locating in female mountings 41 fixed at either side at the inside front part of the bob. Fig. 17a, 17b. The threaded rods are fitted with nuts or wing nuts.

The tubular shaft 30 has a metal rod 35 inserted through it and sits freely on the transverse bar 32, enabling the unit to be pivoted.

15 In another embodiment designed to support the rudder, a piece adapted to the shape of the internal or external front of the tubes forming the toboggan has a tubular part 56 for receiving the rudder shaft 30 and the top part of this piece will form a platform 57 on which the rod 35 inserted through the rudder shaft 30 sits as illustrated in Fig. 23. To prevent friction, a circular cavity representing the pivoting motion of the rod 35 may be provided either on the transverse bar 32, Fig. 17 a, or on the support platform 57, Fig. 23.

FIXING THE BRAKE SYSTEM

Attached to the bottom part of the tubular shaft 30 are hooks 38 or loops, onto which either springs or large elastic elements 37 are fixed, which are in turn attached by hooks 38, thereby providing a link to the tubular shaft 30, and a plate acts as a brake 36. Fig.17a.

25 The springs or elastic elements on the back of the plate 36 are shorter and/or have differing traction strengths so as to provide a gradual braking action.

30 The rear part 39 of the plate 36, which is flexible, brushes against the snow, thereby keeping the rudder 31 straight so that the raft runs straight in the snow, and a sight may be fixed at the front at the joining point between the two tubes. An opening is left free in the canvas, through which the feet can be inserted.

A foot rest 44 is fixed slightly above the part which brushes against the snow. The part following the flexible part 39 is linked either by a joint or hinge or is made from the same material but more solid, and it is desirable if this part can be changed once it becomes worn. Fig.17a, 18a, 18b.

5 ALTERNATIVE SOLUTION FOR THE BRAKE

A Z-shaped strip of flexible material 46 is secured between two plates 36. Fig. 18a. The top plate 36 has hooks 38 on its outer edge enabling the brake plate 36 to be attached and suspended, the latter being linked to the tubes by means of strong elastic elements 37 or springs 43, which are attached to the hooks 38 disposed at the desired height on the tubes 8.

10 BRAKING

Braking is operated by depressing the plate 36 with the feet, either the left or right foot or both together, and then lifting the feet to raise the plate 36, the braking action being harder the stronger the depressing action.

MANUAL STEERING OF THE TOBOGGAN

15 As a variant, the rudder shaft 30 is controlled manually from the handle bar 31 by means of cables and springs supported on two brake plates or a shaft mounted directly on a brake/steering plate 36 which is kept straight to travel straight and which is inclined slightly to turn, the braking being effected by applying more or less pressure to the shaft. The bob can thus be driven from either a seated or a standing position. Fig. 23. For steering using the force
20 of the arms, foot rests 71, Fig. 16, will be fixed to the inner face of the toboggan on either side of the tubes.

It is possible to form bobs or toboggans with just one seat or with multiple seats, with canvas on each seat or in just one or two seats, or with no canvas. If desired, seats which may or may not be foldable will be fixed to the cross-pieces by welding or bonding or by the fixing means
25 of type 41, Fig. 17b, for example.

CLAIMS

1. Inflatable structure(s) characterised:

- a) in that said structure (1) comprises wide openings (5) between its members, of which the plurality of elements, crosses (2), T-bars (4), corners (3), bends, used to form the openings (5) define the periphery and surface of the structure (1) in the form of a base module which comprises, on its periphery, transport means and at least one inflation/deflation valve (19) corresponding to an air chamber, which module can be used on its own,
- b) in that said module thus assembled has means for rapidly assembling and dismantling a netting or canvas (18) and accessories (16) (11) which are attached to the inner/outer periphery of at least one opening (5) and at least at one height, the fixing means (10) (66) (7) (17) (70) for the netting or canvas (18) and accessories (16) (11), if the latter are likely to cause friction which can cause injury to the human body, being covered with a protective strip of fabric 49 which can be folded or absorbs impacts, which module can be used on its own,
- c) in that the module a or b thus assembled has means for establishing a bridge (9) between two modules, it being possible to walk on this bridge (9), these means (59) (11) (12) (7) (13) (60) (66) (67) (49) being repeated on each side of the base module, wherever an adjacent structure is to be put in place,
- d) said inflatable structure (1), which consists of one or more modules which are joined together, has means (48) on the contour of its bottom periphery for attaching weighted netting (47) if it is desirable to prevent access to the structure from underneath,
- e) said inflatable structure (1) has protective strips (68) if it is intended to withstand friction and impacts.

2. Inflatable structure as claimed in claim 1 b, c, e, characterised in that the inflatable structure (1) for lifesaving in a swimming pool is faced with a metal grille (69) underneath, the dimensions of which are the same as the internal dimensions of the swimming pool, the grille comprising bars (22) which slide into fabric strips (26) provided underneath the grille (69) and locate in the connectors, corners (25), T-bars (23), crosses (24), said metal grille (69) either resting on the base of the swimming pool

or being embedded in the base of the swimming pool, the swimming pool walls being protected from impacts by protective strips (68) placed on the structure (1) or by anti-impact stops disposed on the metal grille (69) or the walls of the swimming pool.

- 5 3. Inflatable structure as claimed in claim 1 a, b, characterised in that the bridge (9) between two modules is made by applying two fabric strips (13) with eyelets (7), these fabric strips being attached to the tops of the faces of the modules to be assembled, either placed one on top of the other or side by side, and a rope (11) is passed through the eyelets (7) to assemble them, either above and below or in a zigzag pattern, with a knot (12) tied at each end, and with a protective strip of fabric (49) covering the lacing.
- 10 4. Inflatable structure as claimed in claim 1 a, b, c, characterised in that double-ended hooks (17) are used to fix a bridge (9), netting (18) or canvas.
- 5 5. Inflatable structure as claimed in claim 1 a, b, c, characterised in that a rope with loops (60) is used to attach and dismantle a bridge (9), netting (18) or canvas in association with a strip of fabric 10 with eyelets 7 or two strips of fabric with eyelets 13a and 13b.
- 15 6. Inflatable structure as claimed in claim 1 a, b, c, characterised in that two sets of mooring bitts or hooks (66) are provided, each being attached to a strip of fabric (67) which makes it possible to attach and dismantle a bridge (9), netting (18) or canvas by means of a rope (11) used for the lacing.
- 20 7. Inflatable structure as claimed in claim 1 b, c, d, e, characterised in that a strip of fabric 10 with miniature mooring bitts 66 or hooks is associated with loops 70 at the edge of the netting or canvas 18 and allows attachment thereof.
- 25 8. Inflatable structure as claimed in claim 1 b, c, e, characterised in that, in the life raft application, once the open-work arrangement which can be unlocked, moved apart and re-locked has been made watertight, said open-work arrangement is placed on the watertight canvas and thus forms the floor of the raft.
9. Inflatable structure as claimed in claims 1 a, b, e, 4, 5, 6, 7, characterised in that the structure is made up of two joined tubes (8), the structure being fitted with at least one cross-piece (28), the cross-piece(s) being fixed in the extension of the two arms, thereby forming a toboggan which can be driven in either a standing or seated position by virtue

of means for steering it and braking (30) (31) (35) (34) (32) (40) (41) (36) (37) (38) (39) (44) (46) (20) (56) (55) (57).

- 5 10. Inflatable structure as claimed in claims 1 a, b, e, 4, 5, 6, 7, 9, characterised in that the inflatable structure (1) is provided with a detachable rudder and brake system (30), the brake system comprising an articulated and flexible tubular shaft (30) which can be placed at adjustable positions, fitted with a handle bar (31), the position of the tubular shaft is locked by a metal rod (35) inserted through the tubular shaft, the metal rod sitting freely on a transverse bar (32), which bar may or may not be extendible in width and having a rod (40) underneath the bottom at each end, left and right, which locates in female mountings (41) located on the tubes at either side; the bottom part of the tubular shaft (30) has hooks (38), to which are attached suspension means (37) (38) linked to a brake plate (36) by other hooks (38), a part of this plate (39) brushing against the ground (45).
- 10 11. Inflatable structure as claimed in claims 1 a, b, e, 4, 5, 6, 7, 9, characterised in that the steering system consists of a support (55) for the rudder shaft (30) which is a piece adapted to the shape of the tubes (8), with a tubular part (56) in which the articulated and flexible rudder shaft (30) which can be set at adjustable positions locates, which ends in a single brake and steering plate (36) which can be steered in both a seated and standing position, foot rests being fixed on either side on the inner face of the tubes.
- 15 12. Inflatable structure as claimed in claims 1 a, b, e, 4, 5, 6, 7, 9, 10, 11, characterised in that the brake plate (36) is a Z-shaped strip of flexible material (46) secured between two plates, the top plate being provided with fixing or suspension means (37) (38) linked to the tubes.
- 20 13. Inflatable structure as claimed in claims 1 a, b, c, d, e, 3 to 12, characterised in that the deflated and folded structure (1) is transported in a tarpaulin, suitcase or box which is mounted on a board with rollers (42), provided with a zip fastener, straps (43) and handles (15).
- 25 14. Inflatable structure as claimed in claims 1 b, c, e, 4 to 7, 9 to 13, characterised in that the base of the toboggan has means enabling it to be sealed (54) (52) (53) (51).