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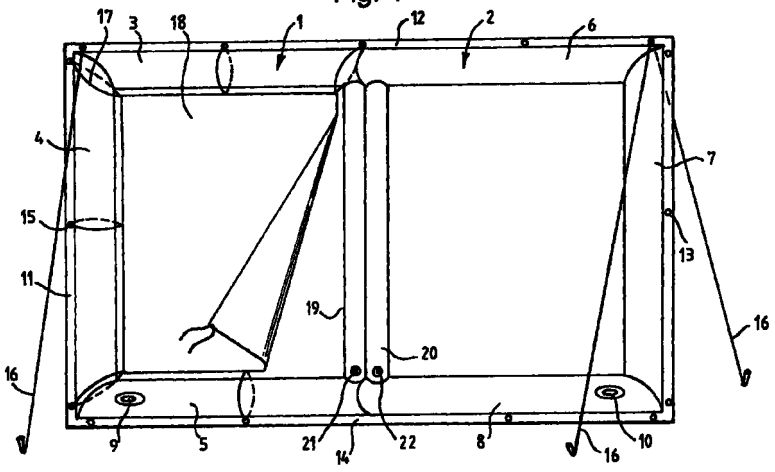
(54) Support structure for advertising

(57) In order to provide a vertically mountable structure which is capable of supporting advertising material, the structure has inflatable structural members capable of withstanding inflation pressures in excess of 15 kPa.

Fig. 1



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Description

[0001] The present application relates to a support structure suitable for supporting advertising material. In particular, the invention is concerned with inflatable support structures for advertising material. A number of support structures for advertising material have been disclosed, for example US 4369591, US 5125177, US 5402591 and US 5778581. These structures have the advantage that they are light and portable. A relatively large structure can be set up using relatively cheap materials. The ease with which these structures can be set up makes them suitable for use at, for example, exhibitions, fairs, open air events etc. These structures are typically constructed of relatively light and cheap material, such as polyvinyl sheets, rubber or urethane coated nylon or polyvinyl chloride sheets. Typically, they are inflated by means of an electrically or petrol driven fan which runs continuously to replace air which leaks out (for example as shown in US 5402591). A sign for use on roadsides which is inflatable using air from a compressed air canister is disclosed in US 5152092, but it is a relatively small article.

[0002] In practice, it has been found that such advertising devices are rather unstable, particularly out of doors if there is a wind, and bulky when deflated.

[0003] The present inventor has realised that the use of somewhat higher inflation pressures than has been common in the art can provide significant advantages in reducing the bulk of deflated structure and increase the strength, size and adaptability of the structure. At the same time, the necessary increases in material weight due to stronger material and stronger joints between areas of material is found to be overcome by the improved strength of the resulting structure.

[0004] Accordingly, the present invention provides a vertically mountable structure for supporting advertising material, the structure comprising inflatable structural members capable of withstanding inflation pressures in excess of 15 kPa (about 2 psi).

[0005] All inflation pressures quoted herein are gauge pressures.

[0006] The structure may be of any suitable design. For example, it could comprise a solid geometrical figure, such as a cube, a rectangular sectioned body, a circular pillar, a sphere etc. The structure is preferably generally flat, like a billboard. It may be in a form of a curved sheet.

[0007] In view of the need for advertising material to be eye-catching and visible, the structure must be capable of being vertically mounted. Any suitable means may be provided to allow the structure to be vertically mountable. It may incorporate means defining a base for resting on the ground. There may be means for attaching or receiving weights or ballast, such as tanks for water or receivers for sand bags for weighting the bottom of the structure. The structure may be rigged vertically with the assistance of other members such as rigid members, guyropes or means for clamping to existing structures, such as structural members on the inside of a building. The structure may be suspendable, for example being provided with suspending means such as hook and eye arrangements etc.

[0008] The sides of the structure when assembled need not be precisely vertical, they may curve or they may be canted inwards or outwards. It is only required that the structure shall have sufficient vertical extent when set up to be a useful support for advertising material. The actual vertical extent will depend upon the intended use of the structure. A structure for use at exhibitions or out of doors may need to be as high as 3 metres. Structures for use in smaller indoor spaces may be smaller.

[0009] The structure will comprise inflatable structural members, hereinafter referred to as inflatable members. These inflatable members may comprise any suitable design of inflatable member such as elongate members or mattress type members. Elongate members are particularly preferred as they are found to give good structural rigidity for relatively low inflated volume at the pressures envisaged in this invention. The elongate inflatable members may be of any suitable cross-section when inflated, but are preferably generally circular when inflated.

[0010] The elongate inflatable members may extend along straight lines, or curved lines or figures defined by lines meeting at corners or nodes. For example, the elongate member may have two side members and a connecting member at right angles to the side members.

[0011] Elongate members which meet one another may be sealed from one another so that they have to be inflated separately. They may be in permanent fluid connection with one another so that they are always inflated together or there may be a variable valve means between them whereby they can be selectively inflated together or separately.

[0012] The structure may comprise structural members which are not inflatable. For example, the structure may comprise rigid members such as rods or beams, or tension members such as tension wires etc. These additional structural members may be located inside the inflatable members, or attached to the flexible walls of the structural members or they may be outside the inflatable members. Preferably, they are contained within the inflatable members. Preferably, substantially all of the compressive load bearing capacity of the structure is provided by inflatable members.

[0013] The structure may comprise a network of elongate inflatable members defining its general shape, spaces or windows being defined between elongate members which can be filled with, for example flexible sheet material. The flexible sheet material may provide a support for advertising material or it may comprise the advertising material itself. These spaces or windows

may of any suitable shape, for example rectangular. At least one side of such a space is defined by an elongate inflatable member, preferably all sides.

[0014] The structure may of any suitable overall dimensions. Preferably, it is at least 1 metre wide and 1 or 1.5 metres high, being preferably at least 1.5 metres wide and 2 metres high. The structure has been found to be suitable for use when it is at least 3 metres high. The present invention can therefore provide exceptionally large and highly visible advertising support.

[0015] It is preferred that the structure has a relatively small floor area in comparison to its height. Preferably, the structure will comprise a floor contacting surface for resting substantially in contact with the floor when the structure is assembled, the least dimension of the floor contacting surface being less than half, preferably less than a quarter, even more preferably less than a tenth, of the total height of the structure. Where the floor contacting area is a figure defined by a plurality of inflatable members with spaces between them, the least dimension is taken to be the least dimension of the figure defined by the inflatable members. However, where guyropes are used, the position of the guyropes is not taken into account when considering the floor area.

[0016] The inflatable members of the structure must be able to withstand an internal pressure of at least 15 kPa, preferably greater than 16.5 kPa, suitably greater than 20 kPa. Suitable maximum inflation pressures are in the range up to 60 kPa, preferably less than 50 kPa.

[0017] Where different parts of the structure are sealed from one another, they may be inflated to different pressures. At least one of the parts of such a structure must be capable of withstanding an internal pressure of at least 15 kPa.

[0018] The structure may be inflated with any suitable fluid. Preferably a gas is used, as this will be light. Preferably, the gas is air. However, where fire is a hazard, inert gases such as nitrogen or carbon dioxide can be used.

[0019] The structure may be provided with inflating means, such as a pump. The pump may be hand operated, foot operated or operated by an electric or internal combustion motor. Alternatively, a cylinder or refillable tank may be provided from which gas under pressure is supplied to the inflatable structure. The tank may be at a pressure significantly higher than the inflation pressure of the structure, gas being delivered to the inflatable structure through a pressure reducing valve. Pump means may be provided for pumping gas from the inflatable structure when it is desired to deflate it, into a storage tank.

[0020] The inflation means may comprise a mechanical pump for inflating the structure to a pressure less than the final desired pressure and a foot pump for inflating up to the final desired pressure.

[0021] The person skilled in the art will be aware of suitable materials for withstanding the inflation pressures described.

[0022] Preferably, the inflatable members comprise a woven fabric, such as nylon, coated with a sealing material, such as rubber, polyvinyl chloride, polyurethane or any other suitable material.

[0023] Further, it may be necessary to provide sealed seams when the sheets of the material from which the inflatable members are made are joined. Such suitable seams may be provided by sewing together sheets of the material in a suitable form, such as a folded over seam. Alternatively or additionally, sealant composition, for example sealant tape may be applied to the seams to prevent leakage of inflating gas.

[0024] The material may have relatively high weight per unit area, being for example in excess of 300 gm^2, preferably in excess of 400 gm^2.

[0025] The rate of leakage of compressing gas is preferably as low as possible.

[0026] The material should have a breaking strength in excess of 1500 N/mm, preferably in excess of 2000 N/mm and a tear strength in excess of 700 N, preferably in excess of 1000 N.

[0027] The person skilled in the art will be able to obtain information about suitable material from the art of construction of inflatable vessels, such as inflatable dinghies. Similar materials and manufacturing techniques may be used to manufacture a structure according to the present invention as are used in the manufacture of inflatable dinghies.

[0028] The inflatable elongate members preferably have a length in the region of at least 1 metre, preferably at least 1.5 metres, suitably greater than 2 metres.

[0029] The cross-sectional dimension of an inflatable member, when inflated, is preferably in the range 10 cm - 1.5 metres, preferably 15 cm - 1 metre, more preferably 20 cm - 60 cm. Elongate inflatable members of different diameters may be present.

[0030] The ratio of length of the inflatable members to their cross-sectional dimension is preferably greater than 5:1, preferably greater than 7.5:1, suitably around 10:1. Preferably, the ratio is less than 12:1, for reasons of rigidity.

[0031] The present invention is suitable for supporting advertising material carried on sheets or in the form of sheets. These sheets may have a total weight greater than 0.2 kg, preferably greater than 0.5 kg, more preferably greater than 1 kg and most preferably greater than 5 kg. Practical embodiments can carry sheets having a total weight of 25 kg or more.

[0032] A particularly preferred class of structures according to the present invention comprise a substantially rectangular frame, comprising elongate inflatable members defining the sides of the frame and means, for example guyropes, for holding the structure in a vertical position when inflated. Preferably, at least one transverse inflatable member is provided extending across the frame, for extra rigidity.

[0033] The inflatable members may comprise pres-

sure control means. Pressure control means may comprise a valve to release gas from the inflatable member when the inflation pressure reaches a selected value. The pressure in the inflatable members may increase, for example, due to the heating effect of the sun or other heat sources. Local atmosphere pressure may change, affecting the pressure differential across the inflatable member surface. The pressure control means may additionally or alternatively comprise means for sensing the pressure in the inflatable member and means for delivering further compressed gas to the inflatable member if the pressure drops below a predetermined value, so that the inflation pressure can be maintained over a long period.

[0034] The present invention can provide a structure for advertising whose total weight without ballast, is small. Preferably, the total weight is in the range 10-50 kg, preferably 25-30 kg.

[0035] The present invention will be further described by way of example only with reference to the accompanying drawings, in which

Figure 1 is a view of the assembled, inflated advertising support structure of the present invention.

[0036] The structure comprises first and second inflatable sections, 1 and 2 respectively. The first inflatable section 1 comprises parallel leg parts 3 and 5 joined by a connecting part 4 at right angles to the leg sections and in fluid communication therewith. Similarly, the second inflatable section 2 comprises leg parts 6 and 8 joined by a connecting part 7. Each of the individual pans 3 to 8 is in the form of an elongate tube which, when inflated, has a generally circular cross section. The diameters of these elongate members when inflated are all 47 cm.

[0037] The elongate members 3, 4 and 5 are in fluid communication with one another so that inflating gas can be delivered to the whole first section 1 through one input which is shown at 9. Similarly, the members 6, 7 and 8 are in fluid communication with one another so that inflating gas can be delivered to the second section 2 through the input 10. A peripheral rim 11, 12, 13, 14 is provided around the outside of the structure. It comprises non-inflated flexible sheet material. A plurality of mounting points in the form of reinforced holes, for example 15 is provided. They may be reinforced with metal or plastic. These mounting points serve to mount support means, for example guyropes 16. They can also be used to mount supporting means, for example supporting loops as shown at 17, which are used to support a sheet 18 which either comprises advertising material or is designed to support advertising material.

[0038] The sheet 18 is shown with one corner released and turned away so that the centre part of the structure can be seen. This centre part comprises a pair of elongate tubes 19, 20 of generally circular cross-section when inflated, of diameter 30 cms. They are provided to improve the rigidity of the centre part of the frame. The members 19 and 20 are provided with valve means 21 and 22 respectively. Each valve means 21 and 22 can act as an input for compressed gas for inflating the respective member 19 or 20. Alternatively, in another position, the valve means 21 or 22 can put the members 19 and 20 in fluid communication with the adjoining members 5 and 8 respectively whereby they can be inflated at the same time as the rest of the structure. In this way, the structure can be inflated by inflating each of the elements 1 and 2 via their respective inputs 9 and 10, with the respective members 19 and 20 being inflated at the same time. Then, if it is necessary to give additional support in the centre of the structure, the members 19 and 20 may be pumped up to a slightly higher pressure through their valves 21 and 20.

[0039] The inflatable structural members and the peripheral rim are constructed of polyurethane coated nylon of a nominal specific weight 455 grams per square metre. The person skilled in the art will be aware of suitable sources of such material.

[0040] Seams and junctions between sheets of this material are formed by sewing and sealing in a manner known from the art of construction of inflatable craft.

[0041] In use, the inflatable structure is inflated to an internal pressure in the range 3-4 psi, by means of a pump (not shown) for example a foot pump may be used.

[0042] The present invention has been described above purely by way of example, and modifications can be made within the spirit of the invention. The invention also consists in any individual features described or implicit herein or shown or implicit in the drawings or any combination of such features or any generalisation of any such features or combination.

Claims

1. A vertically mountable structure for supporting advertising material, the structure comprising inflatable structural members capable of withstanding inflation pressures in excess of 15 kPa.

2. A structure according to claim 1, wherein substantially all of the compressive load bearing capacity of the structure is provided by inflatable members.

3. A structure according to claim 1 or 2, being at least 1 metre wide and 1 metre high.

4. A structure according to any preceding claim, comprising a plurality of inflatable elongate members.

5. A structure according to claim 4, wherein at least one of the inflatable elongate members have a length in the region of at least 1 metre.

6. A structure according to claim 4 or 5, wherein at

least one of the inflatable elongate members has a cross-sectional dimension in the range 10cm - 1.5m.

7. A structure according to any of claims 4-6, wherein the ratio of the length of the inflatable members to their cross-sectional dimension is greater than 5:1.

Fig. 1