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# (54) INFLATABLE LED BALLOON

(57) The present invention relates to an inflatable structure for displaying images comprising: a plurality of LED lights; an inflatable balloon having at least one opening, the balloon comprising an outer surface and an inner surface, the LED lights being attached to the outer surface of the balloon; and a support structure provided in the opening of the balloon, wherein the support structure substantially closes the opening of the balloon, wherein the support structure is provided with a pump and a control system, wherein the pump and the control system are provided on the inside of the balloon, wherein the pump is suitable for generating an air flow through the support structure to the inside of the balloon.

The invention also relates to a method for storing and setting up an inflatable structure and to the use of an inflatable structure.

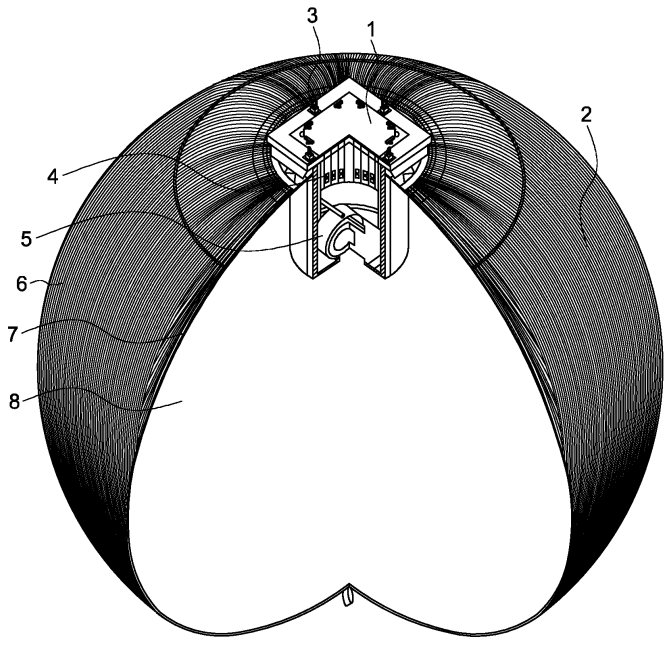


FIG. 1

EP 4 349 437 A1

## Description

### TECHNICAL DOMAIN

**[0001]** The invention relates to an inflatable structure for displaying images. The invention also relates in a second aspect to a method for storing an inflatable structure and in a third aspect to a method for setting up an inflatable structure. In a fourth aspect the invention also relates to a use of an inflatable structure.

### STATE OF THE ART

**[0002]** Displays provide great visibility of notices, messages or images. The visibility of screens is sometimes limited, especially if many viewers want to watch the images at the same time. This can cause unrest among people and even lead to trampling. The solution may be to use more or larger screens.

**[0003]** BR102020014461 describes an inflatable display consisting of a balloon surrounded by a printed nylon covering, the covering being negatively printed so that the non-printed surfaces display the message. The areas related to the message to be conveyed are equipped with an LED strip inside the covering. However, this LED strip only serves as a backlight for the non-printed areas, to display the message.

**[0004]** US20070014125 describes an inflatable balloon and light source adapted to float. The balloon is inflated with a gas that is less dense than air. The light source can be placed in the balloon or externally. However, it is not suitable for large-scale constructions, which require a larger number of light sources on the one hand and a more complex (and therefore heavier) control and energy supply on the other.

**[0005]** These known systems cannot display complex, changing messages and are not suitable for processing data input.

**[0006]** The present invention aims to find at least a solution for some of the above-mentioned problems or disadvantages. The aim of the invention is to provide a method that eliminates these disadvantages.

### SUMMARY OF THE INVENTION

**[0007]** In a first aspect, the present invention concerns an inflatable structure according to claim 1.

**[0008]** The inventors have succeeded in developing an inflatable structure that is suitable for playing images. The inflatable structure is light and can be hung. The weight per screen surface is much lower than with traditional television sets. The LED lights on the surface of the inflatable balloon also provide a screen that can be viewed from all viewing directions. The inflatable structure is ideal for disseminating safety measures, giving instructions, and better displaying objects that are difficult to see, especially when the images need to be visible over a large area. For example, in an aircraft terminal or factory hall there are often many screens. To improve visibility, an inflatable structure can replace these many screens.

**[0009]** Preferred forms of the device are shown in claims 2 to 12.

**[0010]** In a second aspect, the present invention concerns a method according to claim 13. This method has, among other things, the advantage that the fragile inflatable structure with LED lights can be stored without scratches. Storing the inflatable structure in a container is simple using this method. Moving it to another position is easy because the container can be placed in a truck, for example.

**[0011]** In a third aspect, the present invention concerns a method according to claim 14. This method has, among other things, the advantage that the fragile LED lights can be hung up without scratches. Hanging the inflatable structure ensures better visibility of the images played.

**[0012]** In a fourth aspect, the present invention concerns a use according to claim 15. This use results in an improved viewing experience and visibility of the images. The images are visible from all directions.

### DESCRIPTION OF THE FIGURES

**[0013]**

**Figure 1** shows a schematic cross-sectional view of an inflatable structure according to an embodiment of the present invention.

**Figure 2** shows a detailed representation from a top view of a supporting structure according to an embodiment of the present invention.

**Figure 3** shows a method for erecting an inflatable structure according to an embodiment of the present invention.

**Figure 4** shows a detailed representation from a top view of an inflatable structure according to an embodiment of the present invention.

### DETAILED DESCRIPTION

**[0014]** Unless otherwise defined, all terms used in the description of the invention, including technical and scientific terms, have the meanings commonly understood by those skilled in the art of the invention. For a better appreciation of the description of the invention, the following terms are explicitly explained.

**[0015]** "A", "the" and "it" in this document refer to both the singular and the plural unless the context clearly suggests otherwise. For example, "a segment" means one or more than one segment.

**[0016]** An LED light is a light-emitting diode.

**[0017]** Quoting numerical intervals through the endpoints comprises all integers, fractions, and/or real num-

bers between the endpoints, including these endpoints.

**[0018]** In a first aspect, the invention concerns an inflatable structure for displaying images comprising:

- a plurality of LED lights;
- an inflatable balloon with at least one opening, the balloon comprising an outer surface and an inner surface, the LED lights being attached to the outer surface of the balloon; and
- a supporting structure provided in the opening of the balloon, wherein the supporting structure substantially closes the opening of the balloon.

**[0019]** Because the inflatable structure contains a plurality of LED lights, images can be played back in an energy-efficient manner. Because these LED lights are attached to the outer surface of an inflatable balloon, it is possible to suspend this structure, for example from the ceiling of a hall or from pillars. The images that are then played on the inflatable structure are then visible from a great distance and at an angle of 360°.

**[0020]** Because the structure is inflatable, it is possible to obtain a voluminous, preferably spherical structure with LED lights, suitable for playing images. This structure is relatively light compared to screens because it consists of at least 90% air by volume when inflated. As a result, the structure provides a lot of screen surface per kg. The weight per screen surface is much lower than with traditional television sets, due to the use of LED lights or strips. The inflatable structure is light and can be hung. In addition, the structure is three-dimensional unlike straight screens. Straight screens only provide a good viewing experience to viewers who are relatively directly in front of the screen. The inflatable structure can easily be hung due to its low weight, which guarantees a good viewing experience from every viewing direction. The LED lights on the surface of the inflatable balloon also provide a screen that can be viewed from all viewing directions. The inflatable structure is ideal for disseminating safety measures, giving instructions, and better displaying objects that are difficult to see, especially when the images need to be visible over a large area. For example, in an aircraft terminal or factory hall there are often many screens. To improve visibility, an inflatable structure can replace these many screens.

**[0021]** According to an embodiment the supporting structure is equipped with a pump and a control system, whereby the pump and the control system are provided on the inside of the balloon. In contrast to known systems such as US20070014125, the intention here is not to create a floating structure filled with helium or similar gases, but a hanging structure. The provision of a pump serves to guarantee the desired shape, as the structure would deform substantially under pressure from the lights and control system (and pump), and also lose air over time. By providing a pump in the structure, the desired shape can be maintained over longer periods of time.

**[0022]** Because the supporting structure is equipped with a control system, the LED lights and pump can be controlled from the inflatable structure. No wires need to be provided to transfer data. Because the supporting structure closes the balloon, it can be inflated by the pump. The pump is located on the inside of the balloon and is therefore not visible. The and operating systems are also protected from rain on the inside of the balloon.

**[0023]** According to one embodiment, the pump is suitable for generating an air flow through the support structure to the inside of the balloon. According to one embodiment, the supporting structure comprises openings that can be closed.

**[0024]** According to an embodiment the control system is configured to control and power the plurality of LED lights, and control and power the pump.

**[0025]** Because the control system is configured to control and power the plurality of LED lights, no control system needs to be provided outside the inflatable balloon. No external system is required to provide energy for the pump. The control system is configured to control when and how much energy the pump should receive. Because the control system and pump are in the inflatable balloon, the shape of the inflatable balloon can be better retained.

**[0026]** According to a preferred embodiment, the inflatable video playback structure comprises: a plurality of LED lights; an inflatable balloon having at least one opening, the balloon comprising an outer surface and an inner surface, the LED lights being attached to the outer surface of the balloon; and a support structure provided in the opening of the balloon, wherein the support structure substantially closes the opening of the balloon, wherein the support structure is provided with a pump and a control system, wherein the pump and the control system are provided on the inside of the balloon, wherein the pump is suitable for generating an airflow through the support structure to the inside of the balloon and where the control system is configured to control and supply energy to the plurality of LED lights, and to control and supply energy to the pump.

**[0027]** The inflatable structure is suitable for hanging. By inflating the inflatable balloon, the plurality of LED lights are homogeneously distributed over the surface of the inflated balloon. This inflated balloon is suitable for creating a spherical surface with LED lights, whereby these LED lights are suitable for displaying images. These images provide greater visibility of the images compared to a normal, flat screen. The images can therefore be clearly seen by a large group of people, from different viewing directions.

**[0028]** According to a preferred embodiment, the supporting structure comprises at least 2 suspension points facing away from the inside of the balloon, each suspension point being suitable for carrying at least 1000 N, preferably 3000 N, more preferably 4000 N. According to one embodiment, the supporting structure comprises aluminum suspension points, welded to the rest of the supporting structure. The aluminum suspension points

are preferably welded over the entire length so that the supporting structure is watertight and airtight. According to one embodiment, the suspension points are rings or openings through which connecting mounting elements can be inserted. By carrying XN it is meant that it can withstand a vertical force of The mass of the structure multiplied by the rate of fall on Earth gives the weight or force that the Earth exerts on the structure. According to one embodiment, the mass of the inflatable structure is 200-1200 kg, preferably 400-700 kg. According to one embodiment, the mass of the inflatable structure expressed in kg is equal to the diameter of the inflatable balloon in the inflated state multiplied by 50-200, preferably 70-150. According to one embodiment, the inflatable balloon has a diameter of 4-6 meters and the inflatable balloon weighs 5-25 kg, the LED lights 50-300 kg and the supporting structure equipped with pump and control system 100-400 kg. According to one embodiment, the inflatable balloon has a diameter of 2-4 meters and the inflatable balloon weighs 2-20 kg, the LED lights 20-200 kg and the supporting structure equipped with pump and control system 50-200 kg.

**[0029]** According to one embodiment, the inflatable balloon comprises a separate inner and an outer layer, wherein the inner layer is suitable for enclosing air and wherein the LED lights are attached to the outer layer.

**[0030]** Because the inflatable balloon comprises two separate layers, the layers can be made of different materials. An inner layer should be airtight while the outer layer should be strong enough to attach the LED lights. According to one embodiment, the inner layer is made of an elastic material.

**[0031]** According to one embodiment, the outer layer is made of polyester, nylon, polyolefin or cotton and the outer layer is made of polyester, nylon, polyolefin or cotton.

**[0032]** According to one embodiment, the surface density of the outer layer is 30-120 g/m$^2$, preferably 50-90 g/m$^2$. According to one embodiment, the inner layer and the outer layer of the inflatable balloon are suitable to withstand a tensile strength of 300 N/5 cm, preferably 500 N/5 cm and most preferably 600 N/5 cm.

**[0033]** According to one embodiment, reinforcing bands are provided between the inner and outer layers.

**[0034]** The inflatable balloon preferably has a spherical shape when inflated. This desired shape when inflated is easily achieved and maintained by reinforcing bands between the inner and outer layers of the inflatable balloon. Since these bands are between the inner and outer layers of the inflatable balloon, they do not prevent the LED lights from working. In addition, they do not limit the elasticity of the inner layer. This shape is reinforced by the reinforcing bands. According to one embodiment, there are two reinforcing bands between the inner and outer layers of the inflatable balloon. According to one embodiment, the reinforcing bands are attached to the supporting structure. According to one embodiment, the reinforcing bands are made of aluminum. According to one embodiment, the reinforcing bands are 0.5-3 cm thick, 0.5-3 cm and approximately the circumference of the inflatable balloon in length.

**[0035]** According to an embodiment, at least a part of the LED lights are connected together to form an LED strip, preferably wherein the LED lights are grouped into groups, and wherein the LED lights of the groups are interconnected to form formation of LED strips, and where each LED strip is connected to the control system.

**[0036]** Because at least a part of the LED lights are connected to each other to form an LED strip, these lights can easily be controlled by the control system. The desired images can be shown on the LED lights by the control system. According to one embodiment, the control system is suitable for storing the position of the different LED lights and linking them to the desired images. Because each LED strip is connected to the control system, the control system can divide the image to be projected over the different LED strips. According to one embodiment, the LED strips are located on the longitudinal lines of the inflatable balloon in the inflated state, preferably the control system is then located at the upper pole. Longitudinal lines run from the top point to the bottom point of the inflatable balloon when inflated. The upper point and the lower point are called the poles. This allows the LED strips to be placed parallel next to each other, which ensures good image quality. According to one embodiment, the inflatable balloon is substantially spherical when inflated and the length of all LED strips is 30-48% of the circumference of the inflatable balloon when inflated. According to one embodiment, the inflatable balloon is virtually spherical when inflated and there are 2-6 different types of LED strips with different lengths. According to one embodiment, the inflatable balloon is substantially spherical when inflated and the length of:

- 40-60% of the LED strips 100-150% of the diameter of the inflatable balloon when inflated; and
- 40-60% of the LED strips 70-100% of the diameter of the inflatable balloon when inflated.

**[0037]** According to one embodiment, the supporting structure is made of aluminum.

**[0038]** Because the supporting structure is made of aluminium, the supporting structure is sufficiently strong to support the weight of the inflatable structure and sufficiently light not to cause too much weight. Aluminum is machinable and can be welded.

**[0039]** According to one embodiment, the inflatable balloon, when inflated, can withstand a pressure of 150-250 kPa.

**[0040]** Because the inflatable balloon can withstand a pressure of 150-250 kPa when inflated, the inflatable balloon is suitable for keeping the LED lights in a desired shape. In a condition where the pressure is lower, the balloon is not sufficiently firm to hold the LED lights in a desired position and the inflatable balloon will collapse. If the pressure is higher, the inflatable balloon would have

to be made of a material that is too heavy to hang easily, or the material could tear.

**[0041]** According to one embodiment, the plurality of LED lights form a surface on the inflatable balloon with a pixel density between 50 and 300 PPI. According to an embodiment, the plurality of LED lights form a surface on the inflatable balloon with a pixel density between 70 and 300 PPI.

**[0042]** Because the plurality of LED lights form a surface on the inflatable balloon with good pixel density, the image played on the inflatable balloon can be viewed in detail by the people nearby. If the pixel density were lower, an insufficiently sharp image would be displayed. A higher pixel density requires a different technology than LED strips, which are sufficiently light to be applied to an inflatable balloon. According to an embodiment, the plurality of LED lights form a surface on the inflatable balloon with a pixel density between 70 and 200. According to an embodiment, the plurality of LED lights form a surface on the inflatable balloon with a pixel density between 70 and 150. According to an embodiment In this embodiment, the LED strips have a pixel quantity of 30-100 pixels per m, preferably 30-50.

**[0043]** According to one embodiment, the control system can be controlled wirelessly.

**[0044]** Because the control system can be controlled wirelessly, no cables need to be brought to the inflatable structure. According to one embodiment, the operating system is configured to be connected wirelessly to the Internet. According to an embodiment, the inflatable structure can be used to play back video footage taken less than 1 second before, preferably less than 0.1 second.

**[0045]** According to an embodiment, the control system is suitable for storing the position coordinates of the aforementioned lights.

**[0046]** Because the operating system is capable of storing the position coordinates of the aforementioned LED lights, the operating system can divide the input, ie the images to be played, into different segments and give appropriate commands to the appropriate LED lights.

**[0047]** According to one embodiment, the control system is located further from the center of the inflatable balloon than the pump.

**[0048]** Because the control system is located further from the center of the inflatable balloon than the pump, the pump must move the air past and over the control system. This provides a cooling effect of the control system and also of the entire mounting structure. This improves the operation of the control system, there is less chance of overheating and less chance of fire of the inflatable balloon.

**[0049]** According to one embodiment, when the inflated balloon is inflated, at least 20% of its surface is covered with LED lights, preferably at least 40%, more preferably at least 50%.

**[0050]** According to one embodiment, the supporting structure comprises a battery, suitable for supplying the LED lights, the pump and the control system with electricity. According to another embodiment, the supporting structure is provided with 2-5 sockets, suitable for supplying electricity to the LED lights, the pump and the control system.

**[0051]** According to another embodiment, the diameter of the inflatable balloon in the inflated state is at least 0.7 meters, preferably 1 meter. According to another embodiment, the diameter of the inflatable balloon in the inflated state is 1 to 7 meters, preferably 3 to 5 meters. This diameter is suitable for displaying images visible to viewers located on a large surface, such as a football field, and where the inflatable structure is 4-15 meters above the ground.

**[0052]** According to another embodiment, the inflatable structure comprises at least 100 LED strips with a length of at least 1 meter. According to one embodiment, the inflatable structure comprises at least 100 LED strips with a length of at least the cross-section of the inflatable balloon in the inflated state. According to another embodiment, the inflatable structure comprises at least a number of LED strips with a length of at least 1 meter equal to 50-200 times the diameter of the inflatable balloon in meters, preferably 75-125 times, more preferably 75-100 times. This amount of LED strips provided a good quality image, visible from a great distance.

**[0053]** According to one embodiment, the operating system comprises receiving cards. Each receiving card preferably loads 512 x 384 pixels. According to one embodiment, the receiving card can be coupled to an independent controller. According to one embodiment, the receiving card can adjust colors, eliminate color differences and improve the quality of the images. According to one embodiment, the images can be rotated over the surface.

**[0054]** According to one embodiment, the inflatable balloon is filled with air. According to one embodiment, the inflatable balloon is filled with helium.

**[0055]** In a second aspect concerns the invention a method of storing an inflatable structure of the present invention in a container comprising: deflating the inflatable balloon; lowering the inflatable balloon at a certain speed in a vertical direction into the container; shifting the container at said certain speed in the horizontal direction; attaching the supporting structure to the container.

**[0056]** Because the inflatable balloon is lowered into the container at a certain speed in the vertical direction and the container is shifted at the same speed in the horizontal direction, the inflatable balloon will become stretched out in the container without damaging the LED lights. According to one embodiment, the suspension points of the supporting structure are attached to the container.

**[0057]** In a third aspect the invention relates to a method for erecting an inflatable structure according to the present invention from a container comprising: detaching the supporting structure from the container; lifting the in-

flatable balloon at a certain speed in the vertical direction; shifting the container at said certain speed in the horizontal direction.

**[0058]** Because the inflatable balloon is lifted at a certain speed in the vertical direction and the container is shifted at the same speed in the horizontal direction, the inflatable balloon will be lifted from the container without scratches or tears. According to one embodiment, the inflatable structure is lifted 2-15 meters and secured there. According to one embodiment, the inflatable structure is raised 2-15 meters above the ground surface and preferably secured at this height. According to one embodiment, the inflatable structure is raised above the ground surface 2-15 times the diameter of the inflatable balloon and preferably secured at this height. According to one embodiment, the inflatable structure is raised 2.5-5 times the diameter of the inflatable balloon above the ground surface and preferably secured at this height.

**[0059]** In a fourth aspect concerns the invention a use of the inflatable structure according to the invention for playing back images visible at 360°.

**[0060]** Unlike a conventional screen, the inflatable structure according to the invention can display images in many viewing directions instead of one. Normally one must be directly in front of a screen to see the images properly. Because the current invention is inflatable and has a surface with many LED lights, the images are visible from above, below and from all sides.

## DESCRIPTION OF THE FIGURES

**[0061]** In the following, the invention is described by means of non-limiting examples or figures which illustrate the invention, and which are not intended or should be construed to limit the scope of the invention.

**[0062]** **Figure 1** shows a schematic cross-sectional view of an inflatable structure according to an embodiment of the present invention.

**[0063]** The inflatable structure is suitable for playing images thanks to a supporting structure (1) and a plurality of LED lights on the surface of an inflatable balloon (2). On the top surface of the supporting structure (1) there are suspension points (3), from which the inflatable structure can be hung. In this case the suspension points are rings. Below the top surface of the supporting structure is the control system (4) and below that the pump (5). The support structure (1) substantially closes the opening of the balloon. LED lights (6) are connected to the control system (4) and are suitable for displaying images. The inflatable structure has a very low mass density when inflated compared to conventional screens because its volume is at least 90% air. This makes it easy to hang the inflatable structure and makes the image visible from all directions. The LED lights (6) are attached to the outer surface of the inflatable balloon (7). The inflatable balloon comprises two layers (7) with at least one opening sealed by the support structure (1). The inside of the balloon (8) supplies the pump (5) and control system (4). The pump is suitable for generating an air flow through the support structure (1) to the inside of the balloon (8).

**[0064]** **Figure 2** shows a detailed representation from a top view of a supporting structure according to an embodiment of the present invention.

**[0065]** The supporting structure (1) can be easily opened. This allows work on the pump and control system if necessary. The operating system comprises receiving cards (12). Each receiving card preferably loads 512 x 384 pixels. The receiving cards (12) and the top of the pump (11) are visible if the supporting structure (1) is opened from above.

**[0066]** **Figure 3** shows a method for erecting an inflatable structure according to an embodiment of the present invention.

**[0067]** In step A of Fig. 3, the inflatable structure (21) is in a container (20). In step B of Fig. 3, the supporting structure (1) is detached from the container (20) and attached to, for example, a crane (not shown). The supporting structure (1) is lifted at the suspension points. The container is on wheels (22). The wheels are suitable for rolling the container to where the inflatable structure needs to be placed. In step C of Fig. 3, the inflatable balloon is lifted up at a certain speed in the vertical direction (vertical arrow). The container is then shifted at the same specified speed in the horizontal direction (horizontal arrow). In step D of Fig. 3, the inflatable structure (21) comes loose from the end of the container (23). The inflatable structure can then be raised even higher to the desired height. In step E of Fig. 3, the inflatable structure reaches the desired height and the inflatable balloon can be inflated. In step F of Fig. 3, the container is removed from under the inflatable structure and the inflatable balloon is inflated. Filling and deflating the inflatable balloon is done with the pump. Storing the inflatable structure is done in the reverse order of setting it up, ie steps F-A.

**[0068]** **Figure 4** shows a detailed representation from a top view of an inflatable structure according to an embodiment of the present invention.

**[0069]** The supporting structure (1) comprises four suspension points (3), whereby the suspension points (3) are rings, suitable for suspending the inflatable structure. The supporting structure (1) contains eight screws (35) at the top, suitable for airtightly attaching a plate to the rest of the supporting structure (1). The plate can be detached, after which you can look or work inside the inflatable balloon as shown in Figure 2. The supporting structure (1) has several sockets (31) through which electricity or data can enter. The inflatable balloon (2) has a spherical shape and its surface is covered with LED lights of different lengths. Three different types of LED strips are shown, with different lengths: the longest LED strips (32), the middle LED strips (33) and the short LED strips (34). All LED strips start at a certain distance from the upper pole and continue to a similar distance from the lower pole. There are always twice as many LED strips of a certain type than of the next longer type. The LED strips do not have full-length LED lights. For example,

the longest LED strips (32) run under the end of the short LED strips (34). In places where longer LED strips run under shorter LED strips, they are not equipped with lights.

**[0070]** The longest LED strips (32) start against the supporting structure. The middle LED strips (33) start at a distance from the pole between the radius of the inflatable balloon divided by 6 and the radius of the inflatable balloon divided by 3. The short LED strips (34) start at a distance from the pole between the radius of the inflatable balloon divided by 3 and the radius of the inflatable balloon divided by 1.5.

## Claims

1. Inflatable structure for playing images comprising:

   - a plurality of LED lights;
   - an inflatable balloon with at least one opening, the balloon comprising an outer surface and an inner surface, the LED lights being attached to the outer surface of the balloon; and
   - a supporting structure provided in the opening of the balloon, whereby the supporting structure substantially closes the opening of the balloon, **characterized in that** the supporting structure is provided with a pump and a control system, wherein the pump and the control system are provided on the inside of the balloon, wherein the pump is suitable for generating an air flow through the supporting structure to the inside of the balloon and wherein the control system is configured to control and power the plurality of LED lights, and power and power the pump.

2. Inflatable structure according to claim 1, **characterized in that** the supporting structure comprises at least 2 suspension points directed away from the inside of the balloon, each suspension point being suitable for carrying at least 1000 N.

3. Inflatable structure according to claim 1 or 2, **characterized in that** the inflatable balloon comprises a separate inner and an outer layer, the inner layer being suitable for enclosing air and the LED lights being attached to the outer layer.

4. Inflatable structure according to claim 3, **characterized in that** the outer layer is made of polyester, nylon, polyolefin or cotton and the inner layer is made of polyester, nylon, polyolefin or cotton.

5. Inflatable structure according to claim 3 or 4, **characterized in that** reinforcing bands are provided between the inner and outer layers.

6. Inflatable structure according to any of the preceding claims 1-5, **characterized in that** at least a part of the LED lights are connected to each other to form an LED strip, preferably wherein the LED lights are grouped in groups, and wherein the LED lights of the groups are interconnected thereby forming LED strips, and wherein each LED strip is connected to the control system.

7. Inflatable structure according to any of the preceding claims 1-6, **characterized in that** the supporting structure is made of aluminium.

8. Inflatable structure according to any of the preceding claims 1-7, **characterized in that** the inflatable balloon, when inflated, can withstand a pressure of 150-250 kPa.

9. Inflatable structure according to any of the preceding claims 1-8, **characterized in that** the plurality of LED lights form a surface on the inflatable balloon with a pixel density between 70 and 300 PPI.

10. Inflatable structure according to any of the preceding claims 1-9, **characterized in that** the control system can be controlled wirelessly.

11. Inflatable structure according to any of the preceding claims 1-10, **characterized in that** the control system is suitable for storing the position coordinates of the aforementioned LED lights.

12. Inflatable structure according to any of the preceding claims 1-11, **characterized in that** the control system is located further from the center of the inflatable balloon than the pump.

13. Method for storing an inflatable structure according to claims 1-12 in a container, comprising: deflating the inflatable balloon; lowering the inflatable balloon at a certain speed in a vertical direction into the container; shifting the container at said certain speed in the horizontal direction; attaching the supporting structure to the container.

14. Method for erecting an inflatable structure according to claims 1-12 from a container, comprising: detaching the supporting structure from the container; lifting the inflatable balloon at a certain speed in the vertical direction; shifting the container at said certain speed in the horizontal direction.

15. Use of the inflatable structure according to any one of claims 1-12 for playing back images visible at 360°.

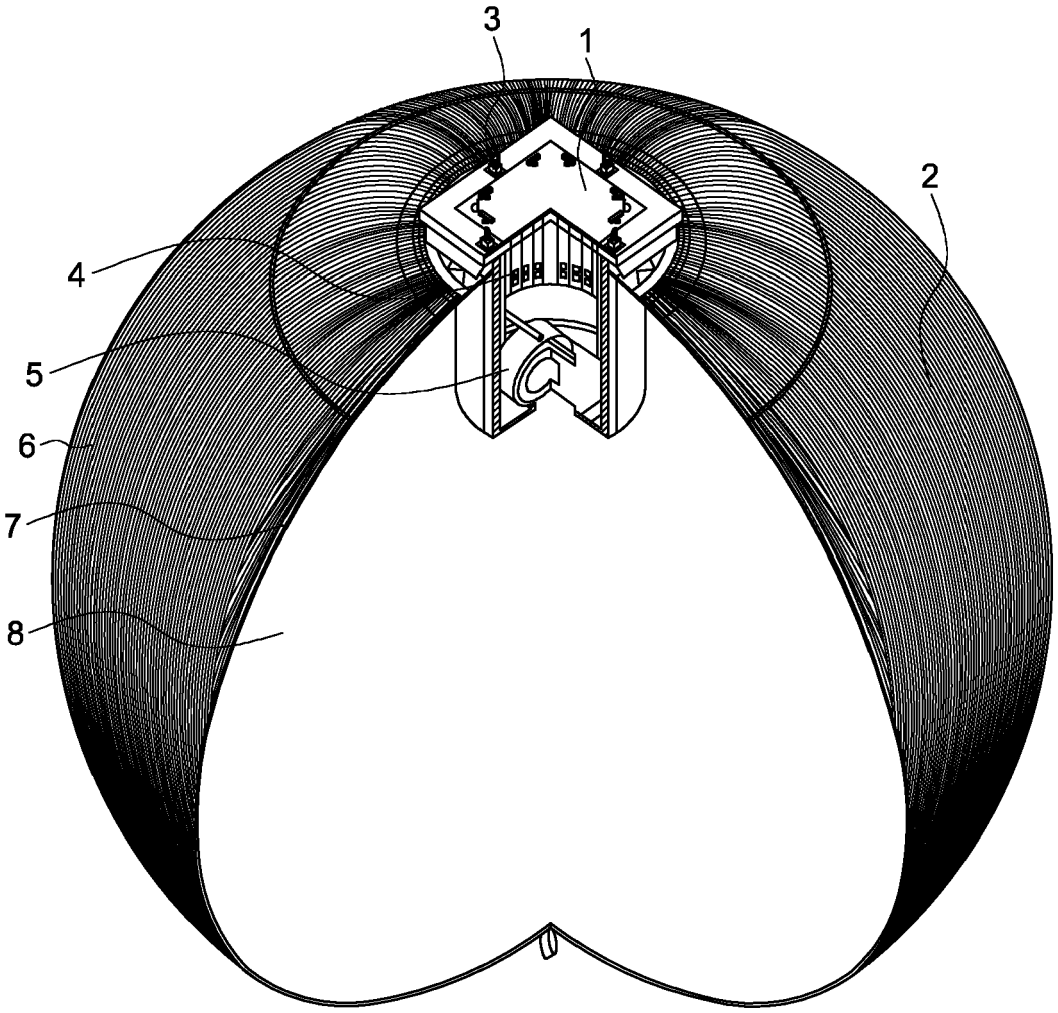


FIG. 1

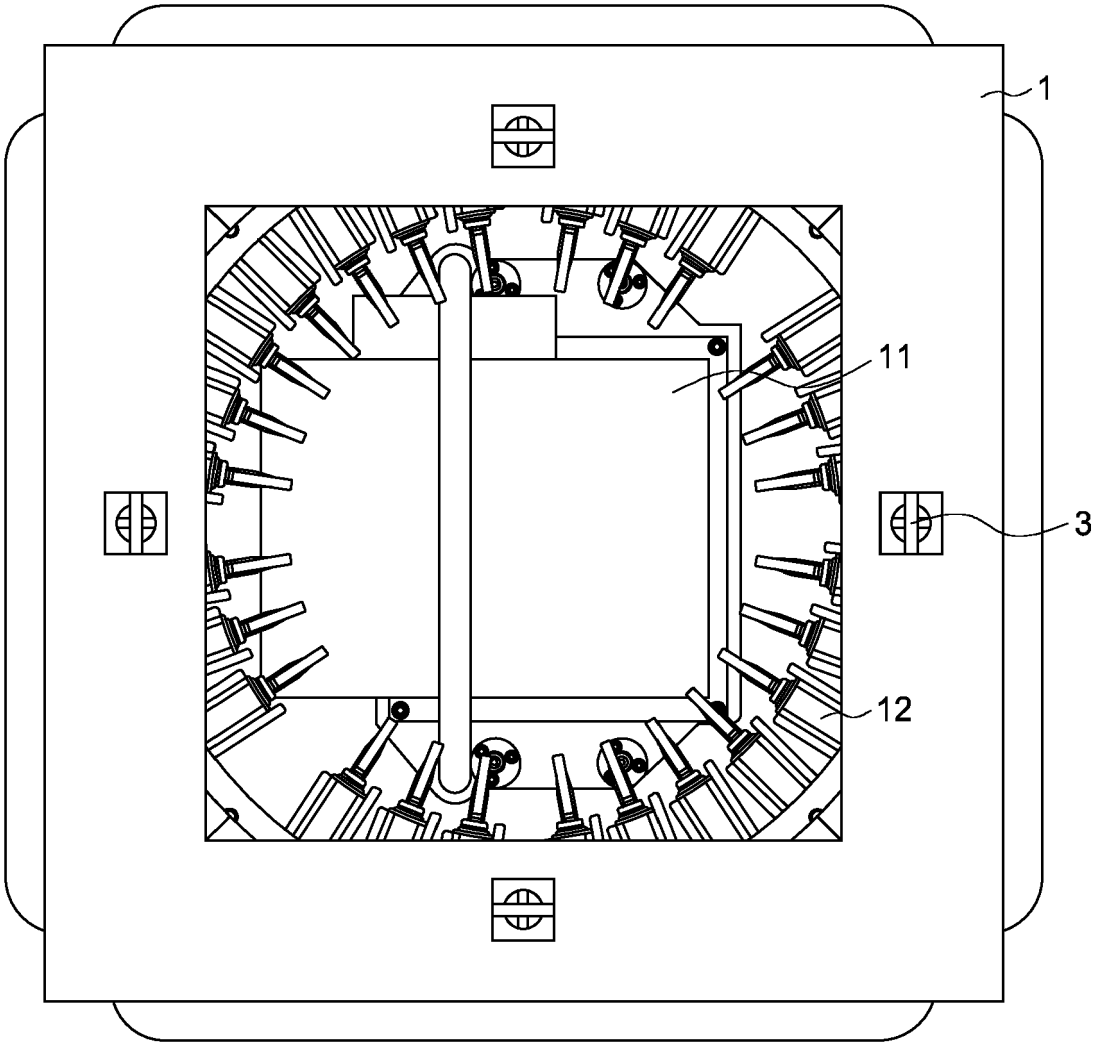


FIG. 2

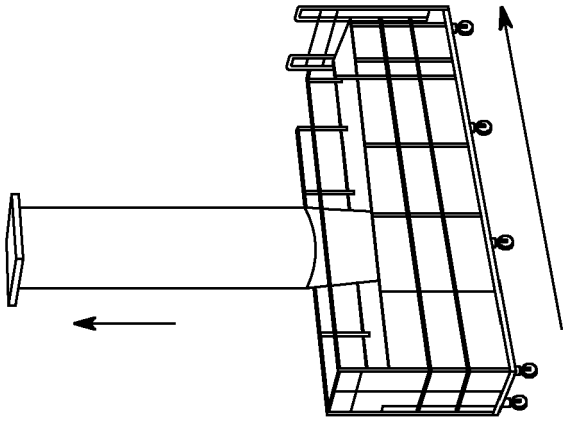

FIG. 3C

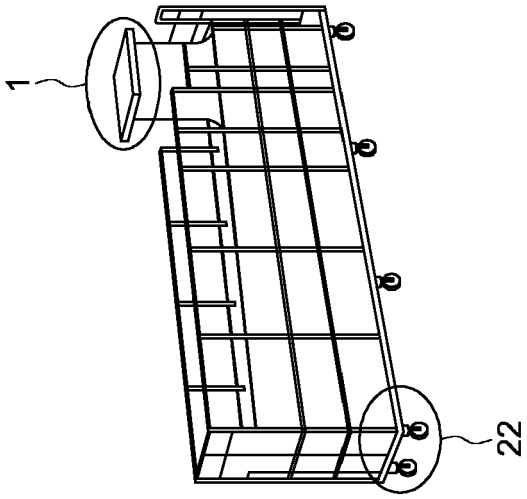


FIG. 3B

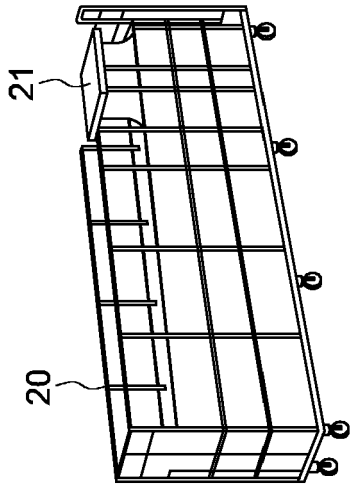


FIG. 3A

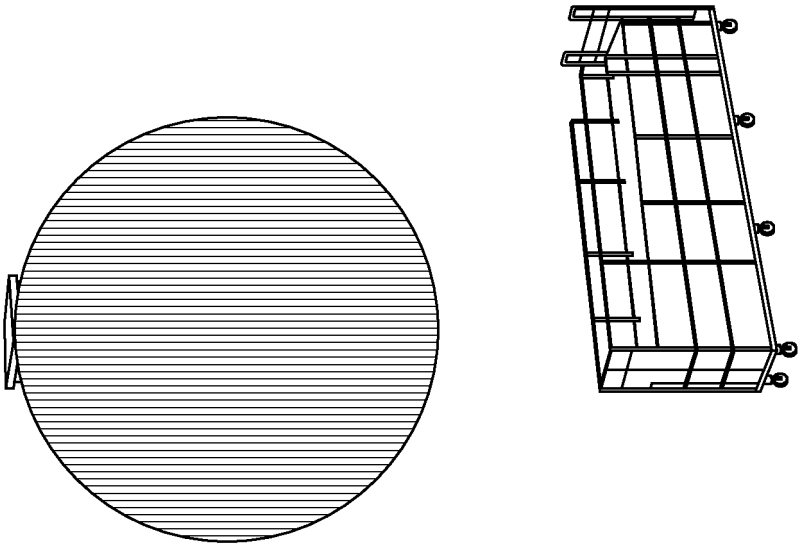

FIG. 3F

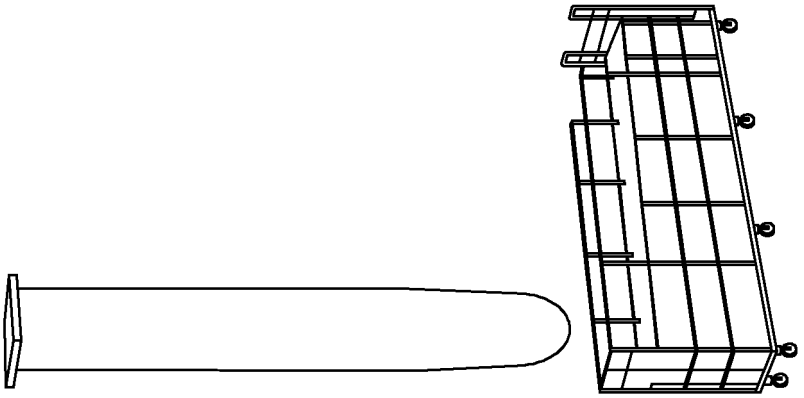

FIG. 3E

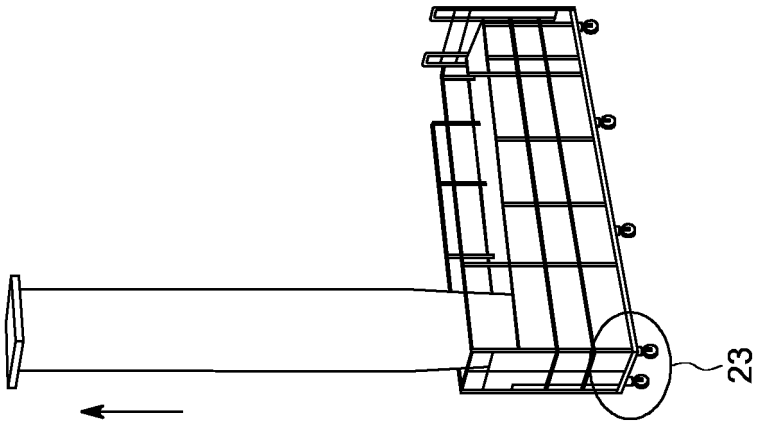


FIG. 3D

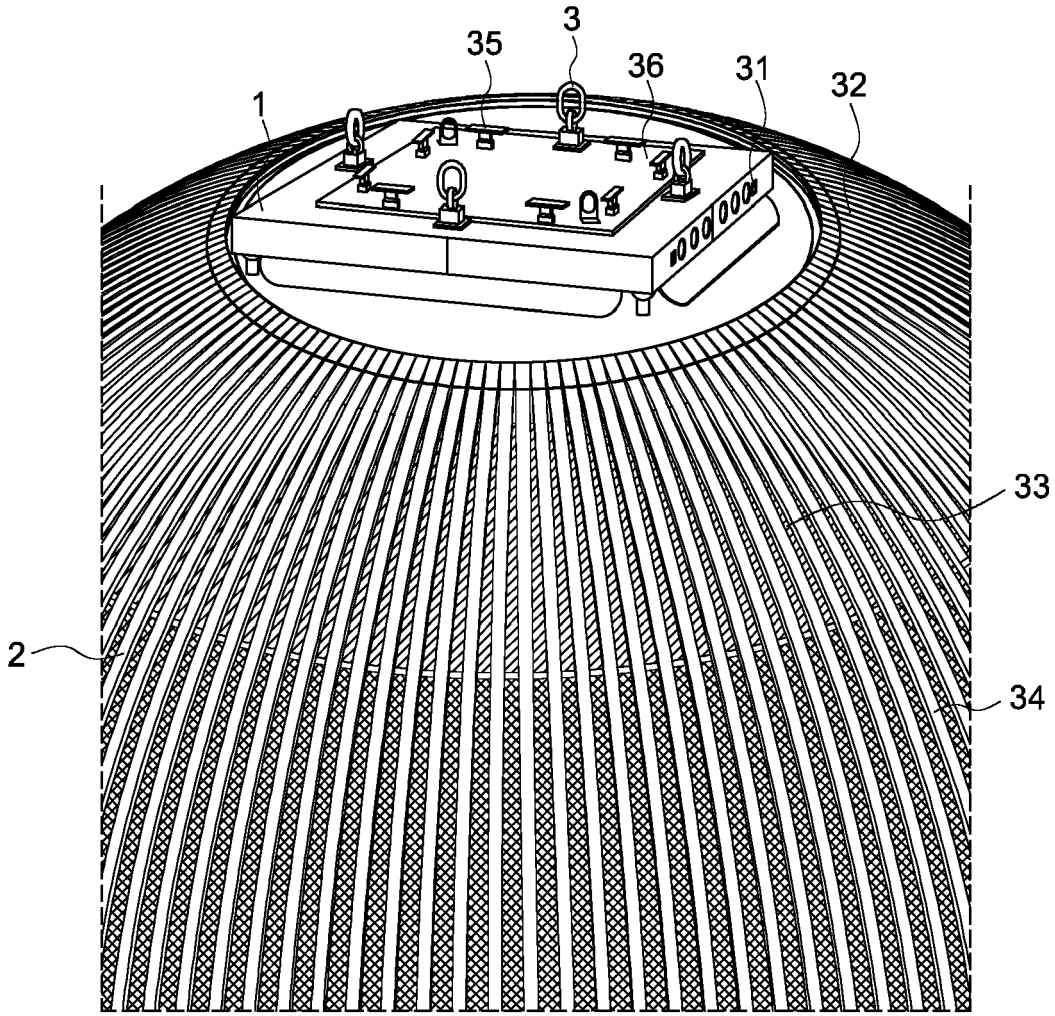


FIG. 4

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# EUROPEAN SEARCH REPORT

Application Number
EP 23 20 2193

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
| A | US 9 418 627 B2 (TAIT TOWERS MFG LLC [US]; TAIT TOWERS MFG LLC [US]) 16 August 2016 (2016-08-16) * column 2, line 45 - column 5, line 50; figures * | 1-10 | INV. A63H27/10 |
| A | US 4 179 832 A (LEMELSON JEROME H [US]) 25 December 1979 (1979-12-25) * column 2, line 51 - column 6, line 63; figures * | 1-15 | |
| A | US 8 356 926 B1 (SANDERS HARRY E [US]) 22 January 2013 (2013-01-22) * column 3, line 55 - column 7, line 13; figures * | 1-15 | |
| A,D | US 2007/014125 A1 (CHU CHUN K S [HK]) 18 January 2007 (2007-01-18) * paragraph [0040] - paragraph [0096]; figures * | 1-15 | |
| | | | TECHNICAL FIELDS SEARCHED (IPC) |
| | | | A63H |

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 30 January 2024 | Lucas, Peter |

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30-01-2024

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| US 9418627 B2 | 16-08-2016 | NONE | |
| US 4179832 A | 25-12-1979 | NONE | |
| US 8356926 B1 | 22-01-2013 | NONE | |
| US 2007014125 A1 | 18-01-2007 | NONE | |

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### Patent documents cited in the description


- BR 102020014461 **[0003]**
- US 20070014125 A **[0004] [0021]**