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DESCRIPTION

FIELD OF THE INVENTION

[0001] This invention relates to a water ride attraction, wave forms for a water ride attraction, and a method of entertaining a rider on a water ride attraction.

BACKGROUND

[0002] Amusement park attractions include wave machines that replicate natural waves. Wave machines typically have hard surfaces forming the ride sections of the wave machine. The hard surfaces do not absorb impact if a rider falls during or after riding a wave. It is known for riders to suffer broken bones, bruises, grazes and concussions as a result of falling while riding a wave on a water ride attraction.

[0003] Another disadvantage of known wave machines is the wave machine can only create one type of wave. Known wave machines do not create surfing waves and wake-type waves. Rather, two different wave machines are required for different wave types.

[0004] Various examples of a water ride attraction are described in US 5401117, WO2006/000777, WO2009/064445 and JP H10 137450.

[0005] It is an object of the present invention to provide a water ride attraction that overcomes the disadvantages of known water ride attractions, and/or to at least provide the public with a useful alternative.

SUMMARY OF THE INVENTION

[0006] The invention is defined in the attached independent claims 1,5,10,13 to which reference should now be made. Further, optional features may be found in the sub-claims appended thereto.

SURFING WAVE FORM

[0007] In accordance with a first aspect of the invention, there is provided a wave form for a water ride attraction according to claim 1.

[0008] In an embodiment, the planar section is adapted to direct water to flow to the concave

section and the concave section is adapted to direct water to flow to the convex section.

[0009] In an embodiment, the planar surface is inclined relative to a horizontal surface. The planar surface is inclined at an angle of about 0 degrees to about 89 degrees, preferably about 5 degrees relative to the horizontal surface.

[0010] In an embodiment, the wave form further comprises a water removal section for removing water from the convex section. The convex section is preferably adapted to direct water to flow to the water removal section. Water preferably flows through the water removal section under the influence of gravity.

[0011] In an embodiment, the wave form further comprises side barriers extending along the sides of the wave form. The side barriers are preferably integrally formed with the planar section, concave section, and convex section. The side barriers preferably follow the profile of the ride surface. The side barriers preferably provide a resilient impact surface for the rider. Additionally, the side barriers preferably substantially contain the water flow over the ride surface.

[0012] In an embodiment, the planar section, concave section, and convex section are integrally formed.

[0013] In an embodiment, the cushion is filled with air. In an alternative embodiment, the cushion may be filled with a suitable gas or liquid.

[0014] Each of the compartments may be a single compartment or may comprise a plurality of sub-compartments.

[0015] In an embodiment, each of the compartments has a predetermined internal pressure. The internal pressure of the first compartment is a relatively high pressure compared to the pressure of the other compartments.

[0016] In an embodiment, the internal pressure of the first compartment is about 6,895 kPa (1 psi) to about 206.843 kPa (30Psi). The internal pressure of the first compartment is suitably chosen so that the planar section of the ride surface is relatively inflexible to provide a relatively smooth flow of water.

[0017] In an embodiment, the internal pressure of the second compartment is about 6,895 kPa (1 psi) to about 206.843 kPa (30psi). The internal pressure of the second compartment is preferably chosen to provide a relatively smooth flow of water and also a resilient impact surface for the rider.

[0018] In an embodiment, the internal pressure of the third compartment is about 6,895 kPa (1 psi) to about 206.843 kPa (30psi). The internal pressure of the third compartment is preferably chosen to provide a resilient impact surface for the rider.

[0019] In an embodiment, the wave form comprises a valve for controlling the air pressure in the wave form. Each compartment preferably comprises a valve. The pressure in each of the compartments may be varied to alter the way in which water flows over the wave form, which allows for different types of waves to be created. The pressure may also be adjusted to provide a softer or harder impact surface for the rider.

[0020] In an embodiment, the wave form is releasably attachable to a water ride attraction. The wave form may be releasably attachable via hook and look fasteners, zip fasteners, straps, or dome fasteners, for example.

[0021] In an embodiment, the wave form is formed from a flexible sheet material. The flexible material may be chosen from cotton, polyester, rayon, or PVC for example. The flexible material will suitably comprise a waterproof material. The coating may be a laminate or coating of rubber, polyvinyl chloride, polyurethane, silicone elastomer, fluoropolymers, and/or wax.

WAKE/RAMP WAVE FORM

[0022] In accordance with a second aspect of the invention, there is provided a wake form for a water ride attraction according to claim 5.

[0023] In an embodiment, the wake form further comprises a water delivery section for delivering water to the central section. The water delivery section extends downwardly towards the central section.

[0024] The wake form also has a water removal section for removing water from the central section.

[0025] In an embodiment, the planar surface is downwardly inclined relative to a horizontal surface. The planar surface is inclined at an angle of about 0 degrees to about 89 degrees, preferably about 5 degrees relative to the horizontal surface.

[0026] In an embodiment, the wake form further comprises side barriers extending along the sides of the wake form. The side barriers are preferably integrally formed with the concave sections. The side barriers preferably follow the profile of the ride surface. The side barriers preferably provide a resilient impact surface for the rider. Additionally, the side barriers preferably substantially contain the water flow over the ride surface.

[0027] In an embodiment, the planar section and concave sections are integrally formed.

[0028] In an embodiment, the cushion is filled with air. In an alternative embodiment, the cushion may be filled with a suitable gas or liquid.

[0029] Each of the compartments may be a single compartment or may comprises a plurality of sub-compartments.

[0030] In an embodiment, each of the compartments has a predetermined internal pressure. The internal pressure of the central compartment is a relatively high pressure compared to the pressure of the other compartments.

[0031] In an embodiment, the internal pressure of the central compartment is about 0 kPa (0 psi) to about 206.843 kPa (30psi). In an embodiment, the internal pressure of each of the side compartments is about 6,895 kPa (1 psi) to about 206.843 kPa (30psi). The internal pressure of each of the central and side compartments is preferably chosen to provide a relatively smooth flow of water and also a resilient impact surface for the rider.

[0032] In an embodiment, the wake form comprises a valve for controlling the air pressure in the wake form. Each compartment preferably comprises a valve. The pressure in each of the compartments may be varied to alter the way in which water flows over the wake form, which allows for different types of wakes to be created. The pressure may also be adjusted to provide a softer or harder impact surface for the rider.

[0033] In an embodiment, the wake form is releasably attachable to a water ride attraction. The wake form may be releasably attachable via hook and look fasteners, zips, straps, or domes, for example.

[0034] In an embodiment, the wake form is formed from a flexible sheet material. The flexible material may be chosen from cotton, polyester, rayon, or PVC for example. The flexible material will suitably comprise a waterproof material. The coating may be a laminate or coating of rubber, polyvinyl chloride, polyurethane, silicone elastomer, fluoropolymers, and/or wax.

[0035] In an embodiment, the wake form has an additional wake forming projection. The additional wake forming projection is preferably an inflatable cushion. The additional wake forming projection may comprise a valve for controlling the air pressure in the additional wake forming projection. The pressure in the additional wake forming projection may be varied to alter the way in which water flows over the wake form, which allows for different types of wakes to be created.

[0036] The additional wake forming projection preferably has a longitudinal direction aligned with the direction of water flow. The length of the additional wake forming projection in the longitudinal direction is about 1.5 metres. The width of the additional wake forming projection is about 300 mm, and the height of the additional wake forming projection is about 200 mm.

WAVE MACHINE

[0037] In accordance with a third aspect of the invention, there is provided a water ride

attraction comprising:

an inflatable wave or wake form having a ride surface and an interior, the interior having two or more compartments, the compartments forming a support structure of the wave or wake form and each compartment comprising a plurality of longitudinal adjacent cells, each cell being adapted such that the pressure of the cell can be increased or decreased to manipulate the shape and size of the wave formed by the wave form;

a water delivery arrangement for delivering a flow of water to the inflatable wave form in a flow direction;

the ride surface being so arranged as to allow a rider to ride on the flow of water above the ride surface in a direction generally transverse to the direction of water flow.

[0038] In an embodiment, the inflatable wave form comprises the wave form of the first aspect described above. In alternative embodiment, the inflatable wake form comprises the wake form of the second aspect described above.

[0039] In an embodiment, the inflatable wave form is selectively interchangeable with another inflatable wave form.

[0040] In an embodiment, the water ride attraction further comprises a base. The inflatable wave form is preferably releasably attachable to the base.

[0041] In an embodiment, the water delivery arrangement further comprises a water reservoir for storing water. In one embodiment, the water delivery arrangement may be adapted to deliver water from a natural source of water, such as a lake, river, stream, or the sea.

[0042] In an embodiment, the water reservoir comprises a funnel having a tank and a stem. In an embodiment, the water reservoir comprises a baffle between the tank and the stem. The stem preferably comprises a substantially vertical section that leads into a transverse section. The transverse section has a variable outlet to control the flow of water out of the stem. The variable outlet preferably comprises a gate.

[0043] In an embodiment, the water ride attraction further comprises a pool for collecting water from the wave form. The water removal section may include a drain in communication with the pool. The drain is preferably in communication with the reservoir for delivering water from the pool to the water reservoir.

[0044] In an embodiment, the water delivery arrangement further comprises a pump for pumping the water to the water reservoir. In a preferred embodiment, the water is continuously recycled from the pool to the reservoir, over the ride surface and back to the pool.

[0045] In an embodiment, the water delivery arrangement is adapted to deliver water to the inflatable wave form at a speed of up to about 50 km/hr, preferably about 30 km/hr.

[0046] In an embodiment, the water delivery arrangement is adapted to deliver water to the inflatable wave form at a depth of about 75 mm to about one metre.

[0047] In an embodiment, the water ride attraction further comprises a line having a first end attached to a support and a second end for a rider to hold. The second end of the line preferably includes a handle. The length of the line suitable corresponds to the distance between the support and the central section of the wave form. The line is preferably a retractable rope. The line is preferably a spring-loaded line.

METHOD OF USING THE WAVE MACHINE WITH THE SURFING WAVE FORM

[0048] In accordance with a fourth aspect of the invention, there is provided a method of entertaining a rider using a water ride attraction comprising:

providing a water ride attraction having an inflatable wave form of the claim 1;

delivering water to the wave form such that the water flows in a direction from the planar section, over the upwardly inclined concave section, and then over the horizontally inclined convex section; and

allowing a rider to ride on the water above the ride surface in a direction generally transverse to the direction of water flow.

[0049] The rider rides in a direction substantially perpendicular to the direction of water flow.

[0050] In an embodiment, the rider initially rides on the water above the planar section of the wave form and is carried to the concave section by the flow of water. Once at the concave section, the rider can ride on the water.

[0051] In an embodiment, the method further comprises ceasing the flow of water, causing the rider to exit the riding area of the water ride attraction. The rider may land on the convex section and/or one of the side barriers.

[0052] In an embodiment, the period of time that the rider uses the water ride attraction is controllable. For example, the period of time may be limited to about one minute.

[0053] In an embodiment, the method further comprises adjusting the internal pressure of one or more of the compartments of the wave form. The internal pressure may be adjusted before and/or during a rider riding on the water.

[0054] In an embodiment, the method further comprises removing the wave form and replacing the wave form with a different wave form.

[0055] In an embodiment, the method further comprises collecting water from the wave form in a pool. The method further comprises delivering the water collected in the pool to the water reservoir. The water is preferably delivered to the water reservoir by pumping the water. In a preferred embodiment, the water is continuously recycled from the pool to the reservoir, over the ride surface and back to the pool.

[0056] In an embodiment, the water delivery arrangement is adapted to deliver water to the inflatable wave form at a speed of up to about 50 km/hr, preferably about 30 km/hr.

[0057] In an embodiment, the water delivery arrangement is adapted to deliver water to the inflatable wave form at a depth of about 75 mm to about one metre.

METHOD OF USING THE WAVE MACHINE WITH THE WAKE/RAMP WAVE FORM

[0058] In accordance with a fifth aspect of the invention, there is provided a method of entertaining a rider using a water ride attraction comprising:

providing a water ride attraction having an inflatable wave form of the claim 5;

delivering water to the wave form such that the water flows in a direction over the central section;

allowing a rider to ride on the water in a direction substantially transverse to the direction of water flow.

[0059] The rider rides in a direction substantially perpendicular to the direction of water flow. The rider preferably rides at least partly over one of the side concave surfaces, through the central section and at least partly over the other of the side concave surfaces. The rider preferably repeatedly rides from one side to the other and back again. In an embodiment, the rider initially rides along the planar section of the wave form and is carried to the concave section by the flow of water.

[0060] In an embodiment, the method further comprises ceasing the flow of water, causing the rider to exit the riding area of the water ride attraction. The rider may land on the convex section and/or one of the side barriers.

[0061] In an embodiment, the period of time that the rider uses the water ride attraction is controllable. For example, the period of time may be limited to about one minute.

[0062] In an embodiment, the method further comprises adjusting the internal pressure of the wave form. The internal pressure may be adjusted before and/or during a rider riding on the water.

[0063] In an embodiment, the method further comprises removing the wave form and replacing the wave form with a different wave form.

[0064] In an embodiment, the method further comprises collecting water from the wave form in a pool. The method further comprises delivering the water collected in the pool to the water reservoir. The water is preferably delivered to the water reservoir by pumping the water. In a preferred embodiment, the water is continuously recycled from the pool to the reservoir, over the ride surface and back to the pool.

[0065] In an embodiment, the water delivery arrangement is adapted to deliver water to the inflatable wave form at a speed of up to about 50 km/hr, preferably about 30 km/hr.

[0066] The term 'comprising' as used in this specification and claims means 'consisting at least in part of'. When interpreting statements in this specification and claims which include the term 'comprising', other features besides the features prefaced by this term in each statement can also be present. Related terms such as 'comprise' and 'comprised' are to be interpreted in a similar manner.

[0067] It is intended that reference to a range of numbers disclosed herein (for example, 1 to 10) also incorporates reference to all rational numbers within that range (for example, 1, 1.1, 2, 3, 3.9, 4, 5, 6, 6.5, 7, 8, 9 and 10) and also any range of rational numbers within that range (for example, 2 to 8, 1.5 to 5.5 and 3.1 to 4.7) and, therefore, all sub-ranges of all ranges expressly disclosed herein are hereby expressly disclosed. These are only examples of what is specifically intended and all possible combinations of numerical values between the lowest value and the highest value enumerated are to be considered to be expressly stated in this application in a similar manner.

[0068] This invention may also be said broadly to consist in the parts, elements and features referred to or indicated in the specification of the application, individually or collectively, and any or all combinations of any two or more said parts, elements or features, and where specific integers are mentioned herein which have known equivalents in the art to which this invention relates, such known equivalents are deemed to be incorporated herein as if individually set forth.

[0069] As used herein the term "(s)" following a noun means the plural and/or singular form of that noun.

[0070] As used herein the term "and/or" means "and" or "or", or where the context allows both.

[0071] The invention consists in the foregoing and also envisages constructions of which the

following gives examples only.

BRIEF DESCRIPTION OF THE DRAWINGS

[0072] The present invention will now be described by way of example only and with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a first preferred embodiment water ride attraction;

Figure 2 is a cross-sectional view of the water ride attraction of Figure 1;

Figure 2a is a perspective view of a water delivery duct;

Figure 3 is a perspective view of a second preferred embodiment water ride attraction associated with a river;

Figure 4 is a perspective view of the water ride attraction of Figure 3;

Figure 5 is a perspective view of a third preferred embodiment water ride attraction;

Figure 6 is a cross-sectional view of a wave form together with an associated pool, and gate;

Figure 7 is a perspective view of a wave form;

Figure 8 is a perspective view of a wake form;

Figure 9 is a schematic perspective view showing the construction of a compartment of the wave or wake form;

Figure 10 is a perspective view showing two wave forms and water delivery arrangements associated together to form an alternative water ride attraction;

Figure 11 is a perspective view of a cover for a wave form;

Figure 12 is a perspective view of a preferred embodiment wave form;

Figure 13 is a perspective view of the preferred embodiment wave form of Figure 12 showing straps for attaching the wave form;

Figure 14 is a cross-sectional view of a wave form.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

[0073] With reference to Figures 1 and 2, a first preferred embodiment of a water ride attraction is shown, indicated generally by reference number 1.

[0074] The water ride attraction 1 has an inflatable wave form 2 attached to a base 3, and a water delivery arrangement 5 for delivering a flow of water to the inflatable wave form 2 in a flow direction F. The wave form has a ride surface 7 that is arranged as to allow a rider to ride on the flow of water above the ride surface in a direction generally transverse to the direction F of water flow. In the preferred embodiment shown, the water ride attraction 1 has a pool 9 for collecting water from the wave form 2.

[0075] With reference to figure 2a, the water delivery arrangement comprises a duct 10 having a wide inlet 10a and a narrower outlet 10b. The outlet has a gate 10c providing a variable outlet size to control the flow of water from the outlet. The outlet 10b has a substantially rectangular shape. The outlet 10b, together with the gate 10c, provides a smooth flow of water. The gate controls the flow of water to a depth of about 25 mm to about 150 mm, and may be up to one metre.

[0076] The water delivery arrangement has one or more pumps (not shown) for pumping the water to the duct inlet 10a. The pumps are bolted to the base of the pool 9. The pump is suitably rated to draw a head of about 10 m.

[0077] In the preferred embodiment, the water is continuously recycled from the pool 9 to the reservoir, over the ride surface 7 and back to the pool 9. The water delivery arrangement is adapted to deliver water to the inflatable wave form at a speed of up to about 50 km/hr, preferably about 30 km/hr.

[0078] The water ride attraction 1 has a spring-loaded, retractable line (not shown) having a first end attached to a support (not shown) and a second end for a rider to hold. The second end of the line includes a handle (not shown). The length of the line corresponds to the distance between the support and the central section of the wave form.

[0079] With reference to figures 3 and 4, a second preferred embodiment of the water ride attraction is shown. The second preferred embodiment water ride attraction is similar to the first embodiment of the water ride attraction, except as described below. In the second preferred embodiment, the water delivery arrangement is adapted to deliver water from a natural source of water W, such as a river, lake, stream, or the sea. An inlet 21 feeds water from the natural water source W, via pipes 23 to a water reservoir 25 for storing water at velocities of about 500-40,000 litres per second. After the water flows over the wave form, it is re-circulated to the river.

[0080] The water reservoir comprises a funnel 27 having a tank 29 and a stem 31. The stem 29 has a substantially vertical section 31a that leads into a transverse section 31b. The transverse section has a variable outlet to control the flow of water out of the stem. In the preferred embodiment shown, the funnel has a gate to control the flow of water out of the stem at a depth of about 25 mm to about 150 mm, and may be up to about one metre.

[0081] The stem 31a extends downwardly towards the wave form 2 at an angle of 5 degrees relative to the horizontal surface. During use, the funnel provides a relatively smooth supply of water to the wave form.

[0082] Figure 5 shows an alternative design to the design of Figures 3 and 4. The third preferred embodiment water ride attraction is similar to the second embodiment of the water ride attraction, except as described below. The water is re-circulated from the pool to reservoir by one or more pumps, rather than having water delivered from a river.

[0083] The water ride attraction 1 of figures 1 to 5 includes the first preferred embodiment wave form 2. The wave form 2 is a surfing wave form. In the preferred embodiment shown, the inflatable wave form is selectively interchangeable with another wave form.

[0084] The wave form 2 is an inflatable cushion having a ride surface 7 adapted to support a rider. The ride surface 7 has a substantially planar section 7a, followed by an upwardly inclined concave section 7b, and then a horizontally inclined convex section 7c. In the preferred embodiment shown, the planar section, concave section, and convex section are integrally formed. The entire ride surface 7 includes a cover 8, secured by tie downs 8a. The cover comprises a polypropylene material which is attached to the wave form using hook and loop fasteners. It is also fixed to the front of the duct and gate.

[0085] With reference to figure 11, the cover 8 of the ride surface 7 has inflatable strips with a net between the strips, which the water falls through separating the water from the rider. There is a gap between the wave form and the ride surface which allows the water to run down and return to the pool without pushing the rider down under the water. It will be appreciated that the wave form creates the basic structure, while the cover creates a riding surface. One advantage of the cover is that it protected the inflatable wave form. In particular, the wave form can support surfboards with fins.

[0086] The planar surface 7a is inclined relative to a horizontal surface. The planar surface 7a can be inclined at an angle of about 0 degrees to about 89 degrees. In the preferred embodiment shown, the angle is about 5 degrees relative to the horizontal surface. As shown in figure 2, the planar section 7a is adapted to direct water to flow to the concave section 7b and the concave section is adapted to direct water to flow to the convex section 7c.

[0087] In the preferred embodiment shown, the wave form further comprises a water removal section 7d for removing water from the convex section and providing an exit area for a rider. The convex section is adapted to direct water to flow to the convex section. Water flows through the water removal section under the influence of gravity.

[0088] In the preferred embodiment shown, the wave form 2 further comprises side barriers 7e extending along the sides of the wave form. The side barriers 7e are integrally formed with the planar section 7a, concave section 7b, and convex section 7c and follow the profile of the ride surface 7. The side barriers provide a resilient impact surface for the rider and substantially

contain the water flow over the ride surface 7. Figures 12 and 13 show an alternative embodiment in which the side barriers 7e are formed from more than one compartment 7e'.

[0089] In the preferred embodiment shown, the interior of the cushion has compartments corresponding to the sections of the ride surface 7. The interior of the cushion has a first compartment 7f corresponding to the planar section 7a of the ride surface, a second compartment 7g corresponding to the concave section 7b of the ride surface, a third compartment 7h corresponding to the convex section 7c, of the ride surface, and a fourth compartment 7i corresponding to the water removal section 7d.

[0090] Each of the compartments has a predetermined internal pressure. The internal pressure of the first compartment is a relatively high pressure compared to the pressure of the other compartments. In the preferred embodiment shown, the internal pressure of the first compartment 7f is about 6,895 kPa (1 psi) to about 206.843 kPa (30psi). The pressure ranges mentioned in this specification are gauge pressure, that is, it is zero-referenced against ambient air pressure. The internal pressure of the first compartment 7f is suitably chosen so that the planar section of the ride surface 7 is relatively inflexible to provide a relatively smooth flow of water.

[0091] The internal pressure of the second compartment 7g is about 6,895 kPa (1 psi) to about 206.843 kPa (30psi). The internal pressure of the second compartment 7g is chosen to provide a relatively smooth flow of water and also a resilient impact surface for the rider. The internal pressure of the third compartment 7h is about 6,895 kPa (1 psi) to about 206.843 kPa (30psi). The internal pressure of the third compartment 7h is chosen to provide a resilient impact surface for the rider. The internal pressure of the fourth compartment is about 6,895 kPa (1 psi) to about 206.843 kPa (30psi).

[0092] The wave form has a valve (not shown) for controlling the air pressure in the wave form. The valve is connected to the base 3. The base 3 will have suitable conduits and outlets for controlling the air pressure in the wave form. Each compartment of the wave form has a valve. The pressure in each of the compartments may be varied to alter the way in which water flows over the wave form, which allows for different types of waves to be created. The pressure may also be adjusted to provide a softer or harder impact surface for the rider. Preferably, air is continually pumped into the compartments and is also allowed to continuously leak so that when a rider falls on the compartment, some of the air can exit the compartment, reducing the impact experienced by the rider.

[0093] In an alternative embodiment of the wave form, the compartments 7j may be vertically oriented, as shown in figure 14. In this alternative embodiment, the compressed air cells can be inflated and deflated separately. When the water flow is directed over the wave form, different sized waves can be formed by increasing and decreasing the air pressure. Different shaped waves can also be formed by increasing and decreasing the air pressure. Each cell section can be pressurised to different pressures which manipulates the shape and size of the wave. For example, one form can create a 300 mm to a 4 metre high wave. A form can have

up to 10,000,000 cells, all of which are separately pressurised.

[0094] The wave form 2 is releasably attachable to the base 3 of the water ride attraction. The wave form may be releasably attachable via hook and look fasteners, zip fasteners, or dome fasteners, for example. To further secure the forms to the base, the water ride attraction has covers over the forms. The covers are releasably attachable to the base via hook and look fasteners, zip fasteners, or dome fasteners, for example. Figure 13 shows the wave form having straps for attaching the form to the base. The straps are preferably about 1 metre long. In addition, the front of the wave form will have a rigid plastic component.

[0095] The wave form 2 is formed from a flexible sheet material. The flexible material may be chosen from cotton, polyester, rayon, or PVC for example. The flexible material will suitably comprise a waterproof material having a waterproof coating. The coating may be a laminate or coating of rubber, polyvinyl chloride, polyurethane, silicone elastomer, fluoropolymers, and/or wax. With reference to Figure 9, the material of the wave form is held together by a plurality of strands 2a. The strands create a smooth surface for the wave form. In the preferred embodiment, there are two polypropylene surfaces held together at a distance of about 150 mm by individual strands, which makes sure the surface is as flat and as smooth as possible.

[0096] With reference to Figure 7, a second preferred embodiment wake form is shown. The second preferred embodiment wake form is a wake/ramp form 102. The wake form is an inflatable cushion with a ride surface 107. The ride surface 107 has a substantially planar central section 107a, flanked by an upwardly inclined concave section on one side 107b and an upwardly inclined concave section 107c on the other side. The planar section and concave sections are integrally formed. The wake form also has a water delivery section 107d for delivering water to the central section and a water removal section for removing water from the central section.

[0097] In the preferred embodiment shown, the planar surface is inclined relative to a horizontal surface. The planar surface is inclined at an angle of about 0 degrees to about 89 degrees, preferably about 5 degrees relative to the horizontal surface.

[0098] In the preferred embodiment shown, the wake form further comprises side barriers 107f extending along the sides of the wake form. The side barriers 107f are integrally formed with the concave sections and follow the profile of the ride surface. The side barriers provide a resilient impact surface for the rider and substantially contain the water flow over the ride surface.

[0099] The cushion has an interior with compartments corresponding to the sections of the ride surface. The interior of the cushion has a central compartment 107g corresponding to the central section of the ride surface and side compartments 107g corresponding to the concave sections.

[0100] In the preferred embodiment shown, each of the compartments has a predetermined

internal pressure. The internal pressure of the first compartment is a relatively high pressure compared to the pressure of the other compartments.

[0101] In the preferred embodiment shown, the internal pressure of the central compartment 107g is about 6,895 kPa (1 psi) to about 206.843 kPa (30psi). In the preferred embodiment shown, the internal pressure of each of the side compartments is about 6,895 kPa (1 psi) to about 206.843 kPa (30psi). The internal pressure of each of the central and side compartments is preferably chosen to provide a relatively smooth flow of water and also a resilient impact surface for the rider.

[0102] The wake form comprises a valve (not shown) for controlling the air pressure in the wake form. In the preferred embodiment, each compartment has a valve. The pressure in each of the compartments may be varied to alter the way in which water flows over the wake form, which allows for different types of waves to be created. The pressure may also be adjusted to provide a softer or harder impact surface for the rider.

[0103] In the preferred embodiment shown, the wake form has an additional wake forming projection in the form of an inflatable cushion. The additional wake forming projection may comprise a valve for controlling the air pressure in the additional wake forming projection. The pressure in the additional wake forming projection may be varied to alter the way in which water flows over the wake form, which allows for different types of waves to be created.

[0104] The additional wake forming projection preferably has a longitudinal direction aligned with the direction of water flow. The length of the additional wake forming projection in the longitudinal direction is about 1.5 metres. The width of the additional wake forming projection is about 300 mm, and the height of the additional wake forming projection is about 200 mm.

[0105] The wake form is formed from a flexible sheet material. The flexible material may be chosen from cotton, polyester, rayon, or PVC for example. The flexible material will suitably comprise a waterproof material having a waterproof coating. The coating may be a laminate or coating of rubber, polyvinyl chloride, polyurethane, silicone elastomer, fluoropolymers, and/or wax. The water delivery section may comprise a sheet of plastic glued to the surface of the air cushion. The sheet of plastic provides a solid and smooth surface over which water flows before it is delivered to the form.

[0106] Figure 10 shows two wave forms and water delivery arrangements associated together to form an alternative water ride attraction.

[0107] A method of entertaining a rider using a water ride attraction having the surfing wave form will now be described with reference to Figures 1 and 2.

[0108] Water is delivered to the wave form such that the water flows in a direction from the planar section, over the upwardly inclined concave section, and then over the horizontally inclined convex section. A rider is allowed to ride on the water above the ride surface in a

direction generally transverse to the direction of water flow. In the preferred embodiment shown, the rider rides in a direction substantially perpendicular to the direction of water flow.

[0109] In a preferred method, the rider initially rides on the water above the planar section of the wave form and is carried to the concave section by the flow of water. Once at the concave section, the rider can ride on the water above the concave section of the ride surface. After a predetermined amount of time, preferably one minute, the flow of water is ceased, causing the rider to exit the riding area of the water ride attraction. The rider may land on the convex section, on one of the side barriers, and/or in the pool 9.

[0110] The internal pressure of one or more of the compartments of the wake form may be adjusted. The internal pressure may be adjusted before and/or during a rider riding on the water.

[0111] The wave form can be removed and replaced with a different form. Alternatively, one or more compartments may be inflated or deflated to provide a desired ride surface.

[0112] The method includes collecting water from the wake form in a pool 9 and delivering the water collected in the pool 9 to the water reservoir. The water is preferably delivered to the water reservoir by pumping the water. In a preferred method, the water is continuously recycled from the pool 9 to the reservoir, over the ride surface and back to the pool 9.

[0113] In the preferred method, the water delivery arrangement is adapted to deliver water to the inflatable wave form at a speed of up to about 50 km/hr, preferably about 30 km/hr.

[0114] A method of entertaining a rider using a water ride attraction having the surfing wave form will now be described with reference to Figure 8. Figure 8 shows the wake form separate from the other components of the water ride attraction. However, it will be appreciated that unless described below, the method is similar to the method described above in relation to the surfing wake form.

[0115] In the preferred method for using the wake/ramp form shown, the rider initially grasps the handle of the retractable line, rides along the planar section of the wave form and then is carried to the concave section by the flow of water. The line will tighten when the rider is in the correct position. The rider rides in a direction substantially perpendicular to the direction of water flow.

[0116] The rider may ride at least partly over one of the side concave surfaces, through the central section and at least partly over the other of the side concave surfaces. The rider may repeatedly ride from one side to the other and back again. After a predetermined amount of time, preferably one minute, the flow of water is ceased, causing the rider to exit the riding area of the water ride attraction. The rider may land on the wake form, on one of the side barriers, and/or in the pool 9.

[0117] The wake/wave form can be removed and replaced with a different wave form.

[0118] Preferred embodiments of the invention have been described by way of example only and modifications may be made thereto without departing from the scope of the invention.

[0119] For example, in the preferred embodiments described, the cushion is filled with air. In an alternative embodiment, the cushion may be filled with a suitable gas or liquid.

[0120] The wave and wake forms have been described as being attached to the base of the water ride attraction. Alternatively, the forms may be free to float on a water surface. It will be appreciated that the water ride attraction is mobile and the forms can be put into a pool, lake or sea.

[0121] Another alternative use of the wave or wake form would be to place the form in a swimming pool and pump water over the form to create waves for a rider.

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US5401117A [0004]
- WO2006000777A [0004]
- WO2009064445A [0004]
- JPH10137450B [0004]

Patentkrav

1. Bølgeform (2) til en vandforlystelse (1), der omfatter:
en oppustelig pude med en siddeoverflade (7) og et indre;

5 idet siddeoverfladen (7) er tilpasset til at bære en gæst,
idet siddeoverfladen (7) har en langsgående retning, en i det
væsentlige plan sektion (7a), efterfulgt af en opadskrånende,
konkav sektion (7b) og endelig en vandret hældende konveks
sektion (7c); og
10 idet det indre har et første rum (7f), der svarer til den
plane sektion (7a) af siddeoverfladen (7), et andet rum (7g),
der svarer til den konkave sektion (7b) af siddeoverfladen
(7), og et tredje rum (7h), der svarer til den konvekse
sektion (7c) af siddeoverfladen (7), idet rummene danner en
15 støttestruktur for bølgeformen (2); der er kendetegnet ved:
at siddeoverfladen (7) er indrettet til at tillade en strøm af
vand at flyde i den langsgående retning og til at tillade en
gæst at sidde på siddeoverfladen (7) i en retning, der
generelt går på tværs af retningen af vandstrømmen; og
20 at hvert rum omfatter en flerhed af langsgående tilstødende
celler, der strækker sig i den langsgående retning, idet hver
celle er tilpasset, således at trykket i cellen kan øges eller
reduceres for at ændre formen og størrelsen af den bølge, der
dannes af bølgeformen (2).

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2. Bølgeform (2) ifølge krav 1, hvor den plane sektion (7a)
er tilpasset til at lede vand til at flyde til den konkave
sektion (7b), og hvor den konkave sektion (7b) er tilpasset
til at lede vand til at flyde til den konvekse sektion (7c).

30

3. Bølgeform (2) ifølge krav 1 eller krav 2, hvor den plane
overflade hælder i forhold til en vandret overflade.

4. Bølgeform (2) ifølge et hvilket som helst af de
35 foregående krav, hvor det indvendige tryk i det første rum
(7f) forårsager den plane sektion (7a) af siddeoverfladen (7)
til at være forholdsvis ufleksibel, hvor det indvendige tryk i
det andet rum (7g) tilvejebringer en elastisk stødfade for en

gæst, og hvor det indvendige tryk i det tredje rum (7h) tilvejebringer en elastisk stødflade for en gæst.

5. Slipstrømsform (102) til en vandforlystelse (1), der omfatter:

en oppustelig pude med en siddeoverflade (7) og et indre, idet siddeoverfladen (7) har en langsgående retning, en i det væsentlige plan midtersektion, flankeret af en opadskrånende, konkav sektion (7b) på den ene side og en opadskrånende, konkav sektion (7b) på den anden side; kendetegnet ved:

at siddeoverfladen (7) er indrettet til at tillade en strøm af vand at flyde i den langsgående retning, og til at tillade en gæst at sidde på siddeoverfladen (7) i en retning, der generelt går på tværs af retningen af vandstrømmen; og

at det indre har et central rum (107g), der svarer til den centrale sektion af siddeoverfladen (7), og siderum, der svarer til de konkave sektioner (7b) på siddeoverfladen (7), idet rummene danner en støttestruktur for slipstrømsformen (102) og hvert rum omfatter en flerhed af langsgående tilstødende celler, der strækker sig i den langsgående retning, idet hver celle er tilpasset, således at trykket i cellen kan øges eller reduceres for at ændre formen og størrelsen af den slipstrøm, der dannes af slipstrømsformen (102).

6. Slipstrømsform (102) ifølge krav 5, hvor det indvendige tryk i det centrale rum (107g) er et forholdsvis højt tryk sammenlignet med trykket i de andre rum.

7. Slipstrømsform (102) ifølge krav 5 eller krav 6, hvor slipstrømsformen (102) har et ekstra fremspring til at danne slipstrøm.

8. Vandforlystelse (1), der omfatter:

bølgeformen (2) ifølge et hvilket som helst af kravene 1 til 4 eller slipstrømsformen (102) ifølge et hvilket som helst af kravene 5 til 7;

vandtilførselsarrangement (5) for tilførsel af en strøm af

vand til den oppustelige bølgeform (2) eller slipstrømsform (102) i en strømningsretning (F), idet strømningsretningen (F) er parallel med den langsgående retning;

5 idet siddeoverfladen (7) er indrettet til at tillade en gæst at sidde på strømmen af vand over siddeoverfladen (7) i en retning, der generelt går på tværs af retningen af vandstrømmen.

9. Vandforlystelse (1) ifølge krav 8, hvor den oppustelige
10 bølgeform (2) eller slipstrømsform (102) kan udskiftes selektivt med en anden bølgeform (2) eller slipstrømsform (102).

10. Fremgangsmåde til underholdning af en gæst, der bruger en
15 vandforlystelse (1), der omfatter:

tilvejebringelse af en vandforlystelse (1), der har en oppustelig bølgeform (2) ifølge et hvilket som helst af kravene 1 til 4;

20 tilførsel af vand til bølgeformen (2), således at vandet strømmer i en retning fra den plane sektion (7a), over den opadskrånende konkave sektion (7b) og derefter over den vandret skrånende konvekse sektion (7c); og

idet det tillader en gæst at sidde på vandet over siddeoverfladen (7) i en retning, der generelt går på tværs af
25 retningen af vandstrømmen.

11. Fremgangsmåde ifølge krav 10, der yderligere omfatter justering af det indvendige tryk i bølgeformen (2).

30 12. Fremgangsmåde ifølge krav 10 eller krav 11, der yderligere omfatter at fjerne af den oppustelige bølgeform (2) og erstatte den oppustelige bølgeform (2) med en anden oppustelig bølgeform (2).

35 13. Fremgangsmåde til underholdning af en gæst, der bruger en vandforlystelse (1), der omfatter:

tilvejebringelse af en vandforlystelse (1), der har en oppustelig slipstrømsform (102) ifølge et hvilket som helst af

kravene 5 til 7;

tilførsel af vand til slipstrømsformen (102), således at vandet strømmer i en retning over den centrale sektion;

idet det tillader en gæst at sidde på vandet i en retning, der
5 i det væsentlige går på tværs af retningen af vandstrømmen.

14. Fremgangsmåde ifølge krav 13, der yderligere omfatter justering af det indvendige tryk i ét eller flere af rummene i slipstrømsformen (102).

10

15. Fremgangsmåde ifølge krav 13 eller krav 14, der yderligere omfatter at fjerne af den oppustelige slipstrømsform (102) og erstatte den oppustelige slipstrømsform (102) med en anden oppustelig slipstrømsform

15

(102).

DRAWINGS

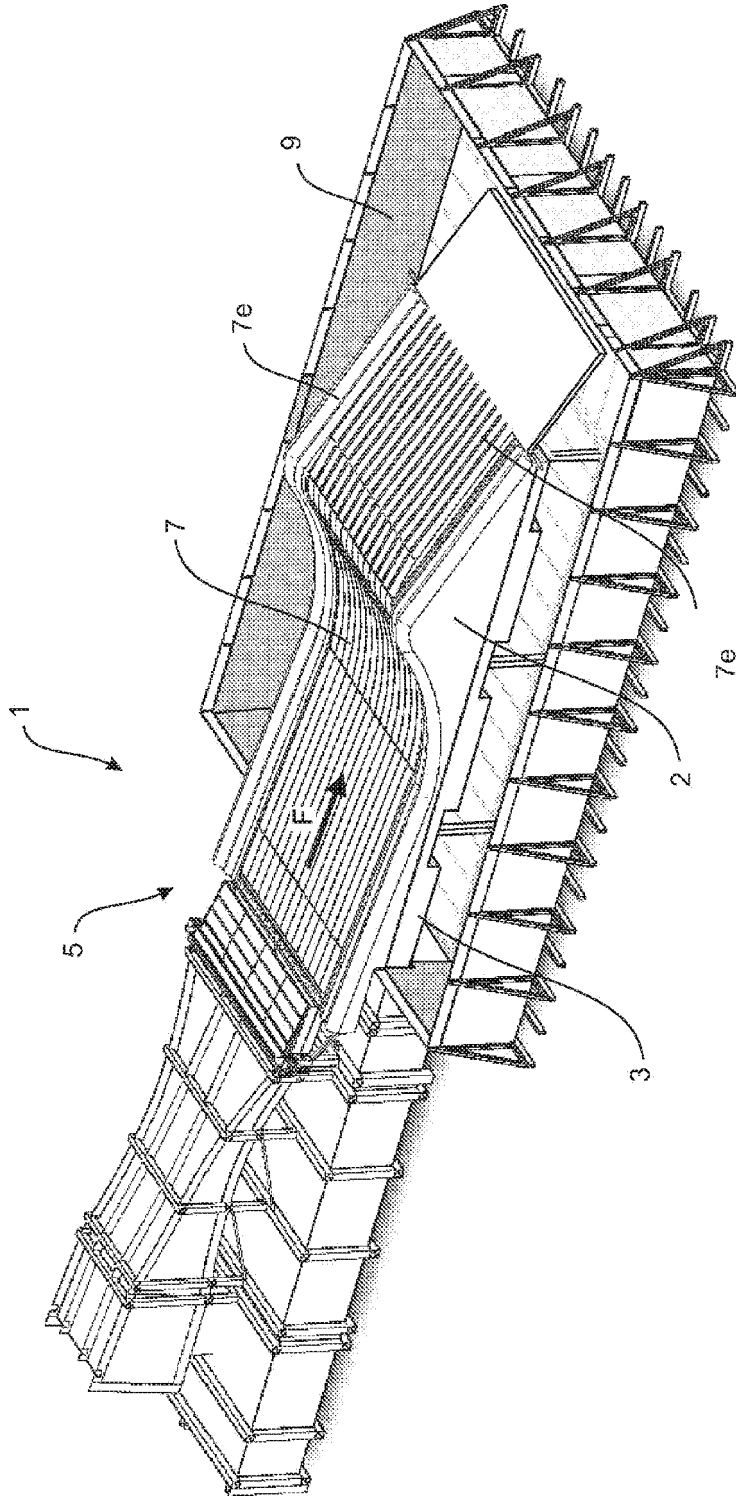


FIGURE 1

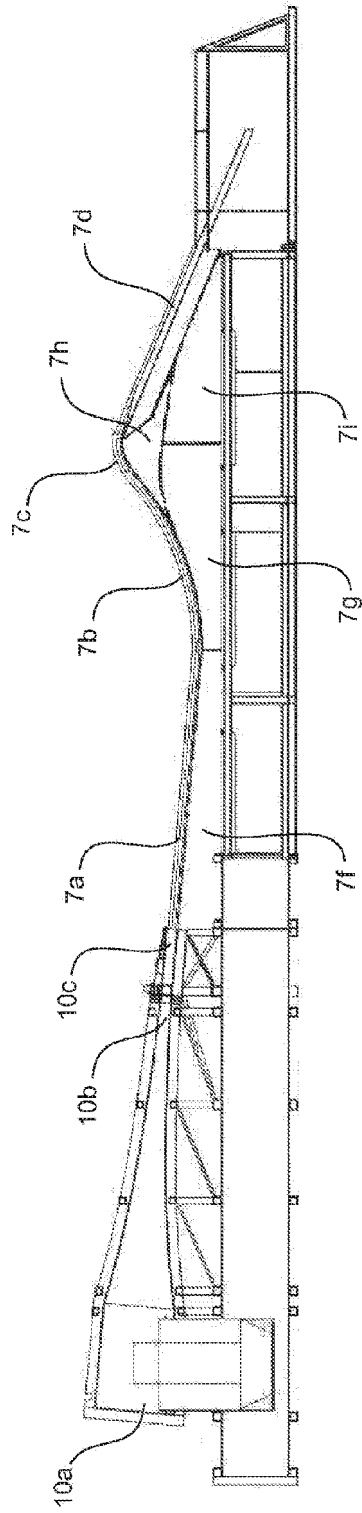


FIGURE 2

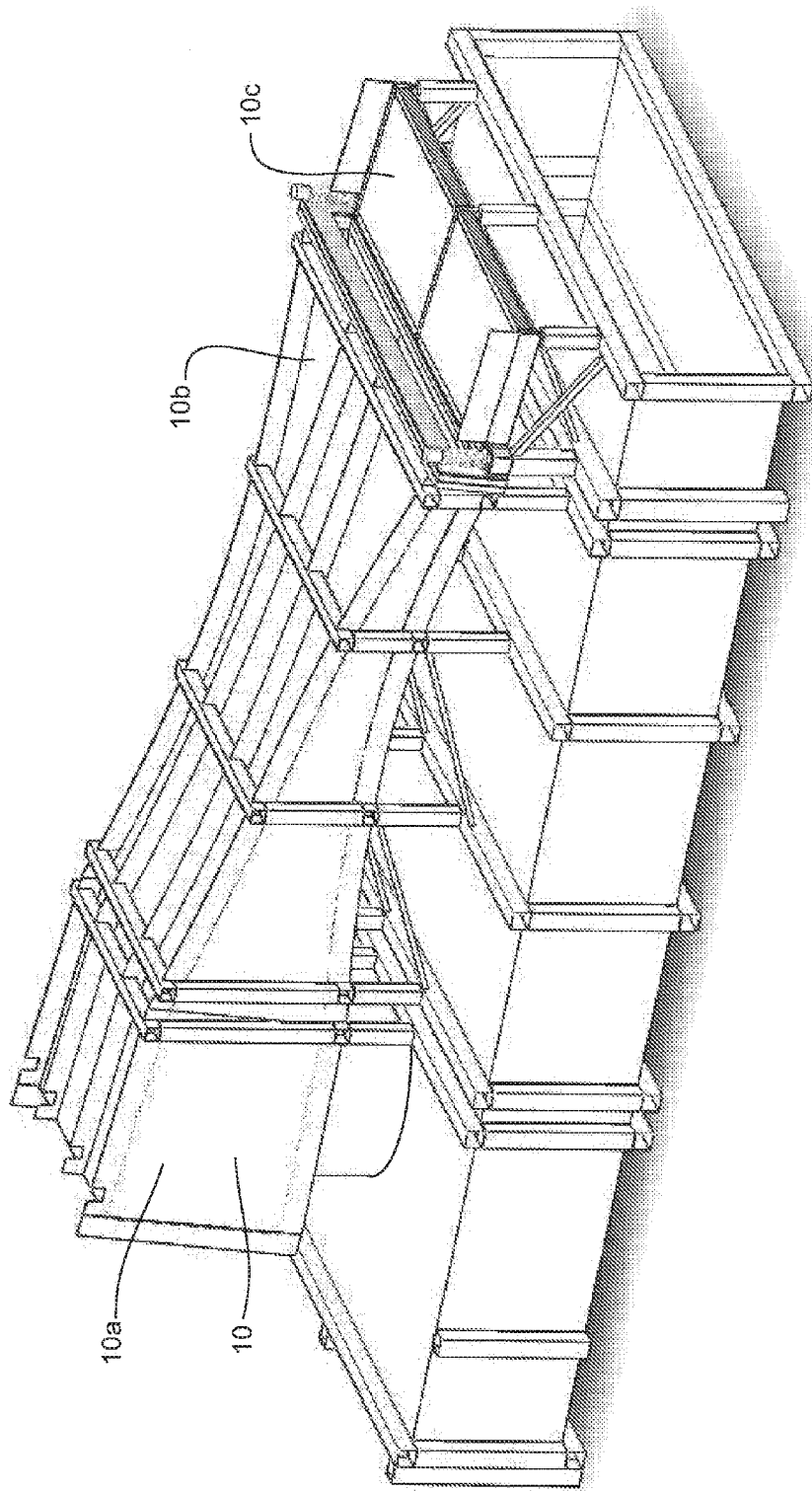


FIGURE 2a

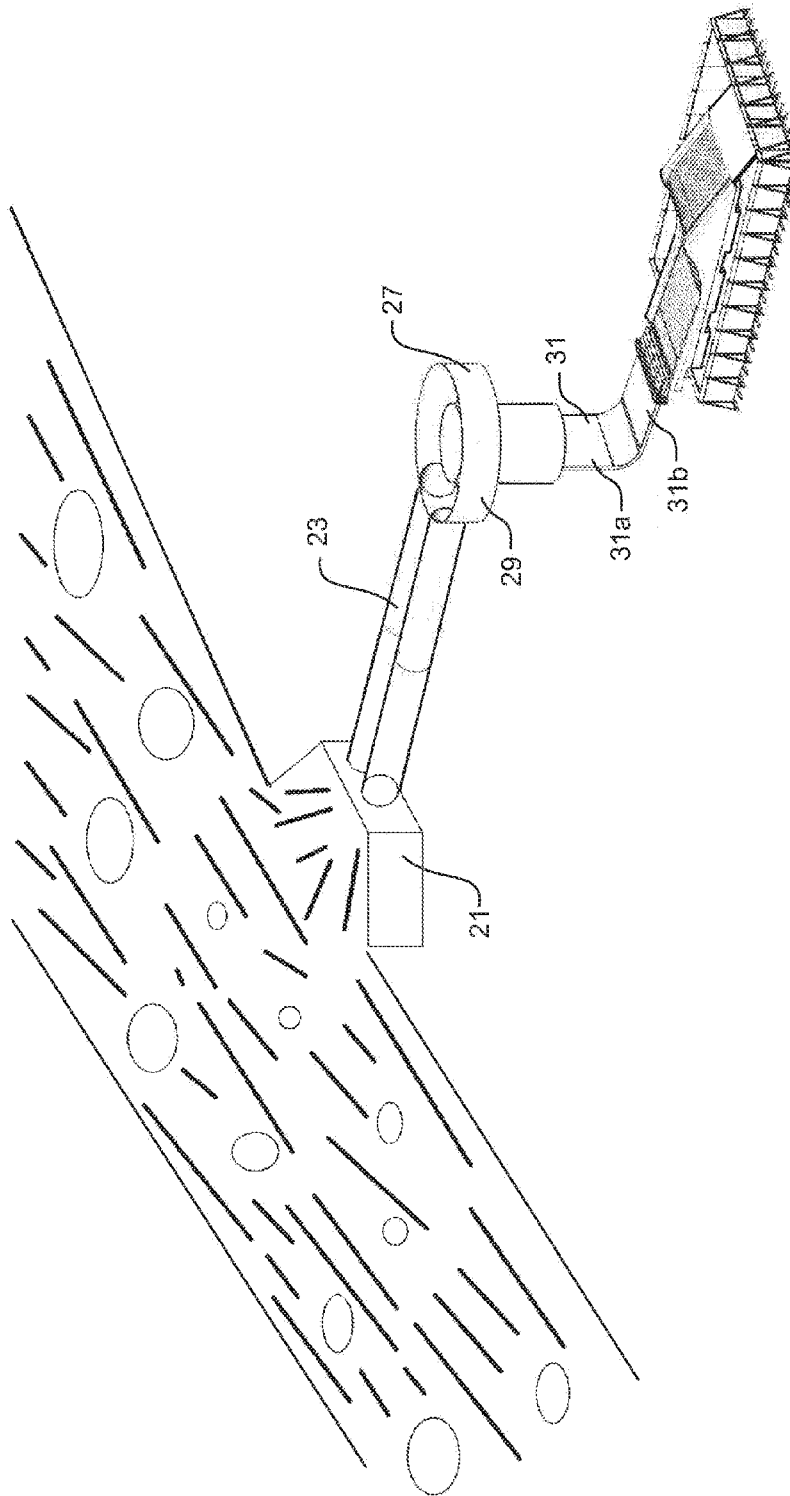
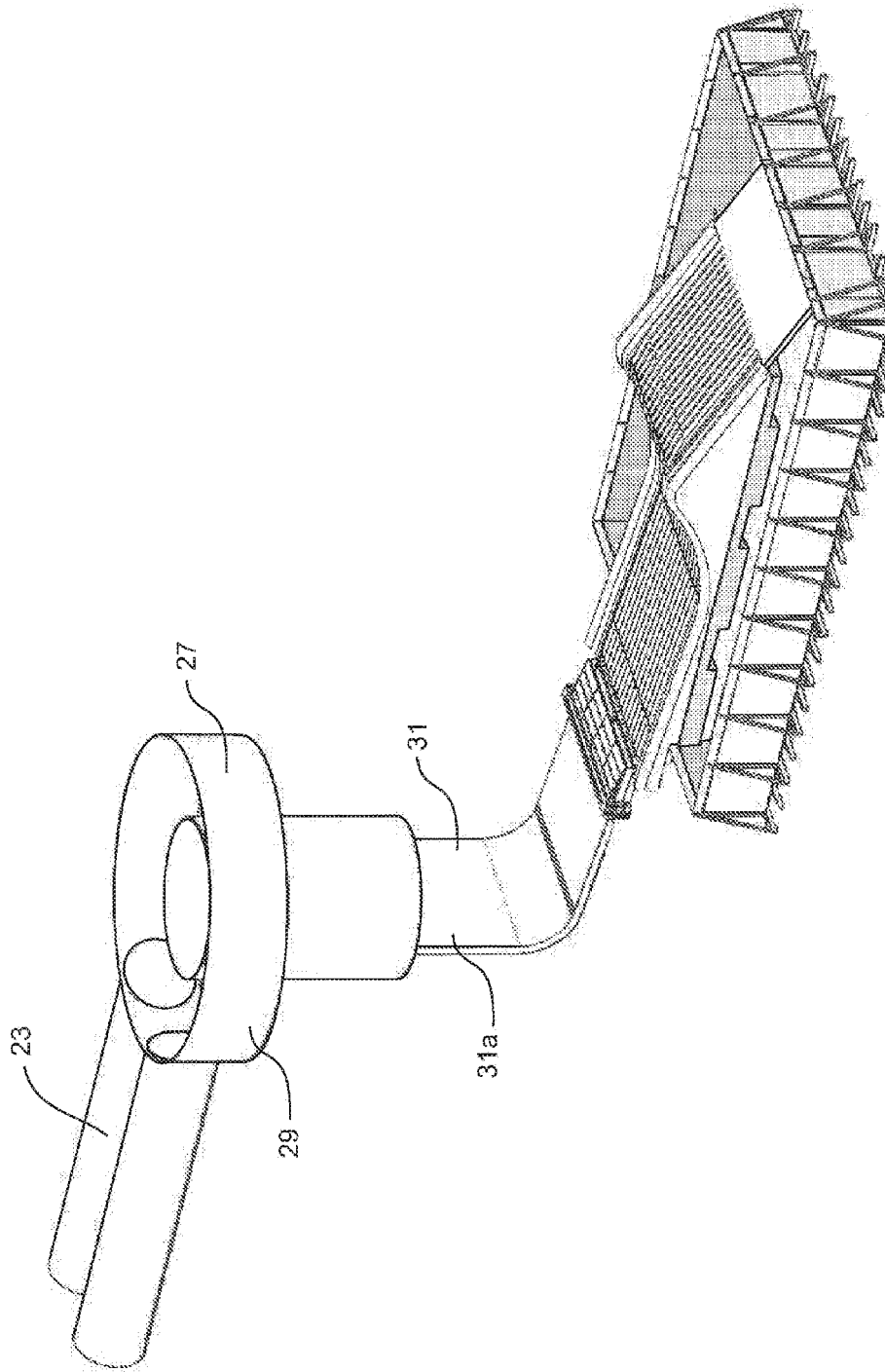


FIGURE 3

**FIGURE 4**

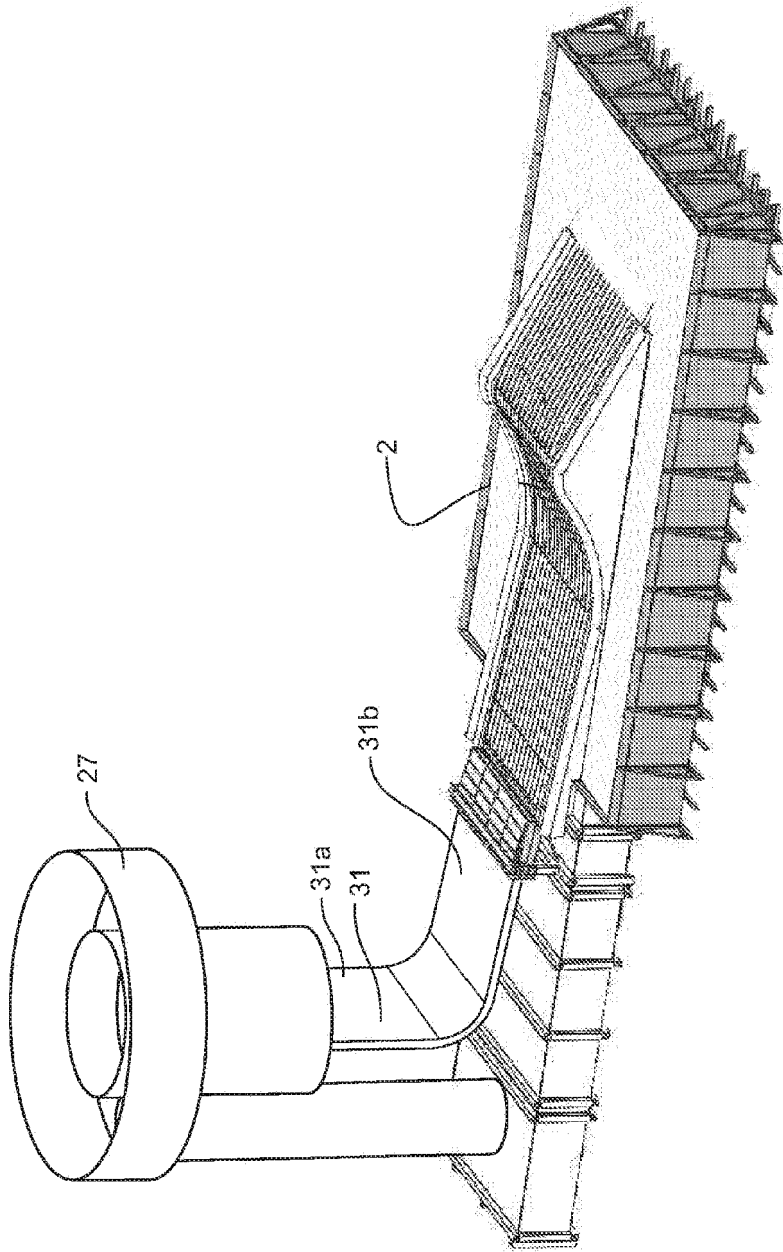


FIGURE 5

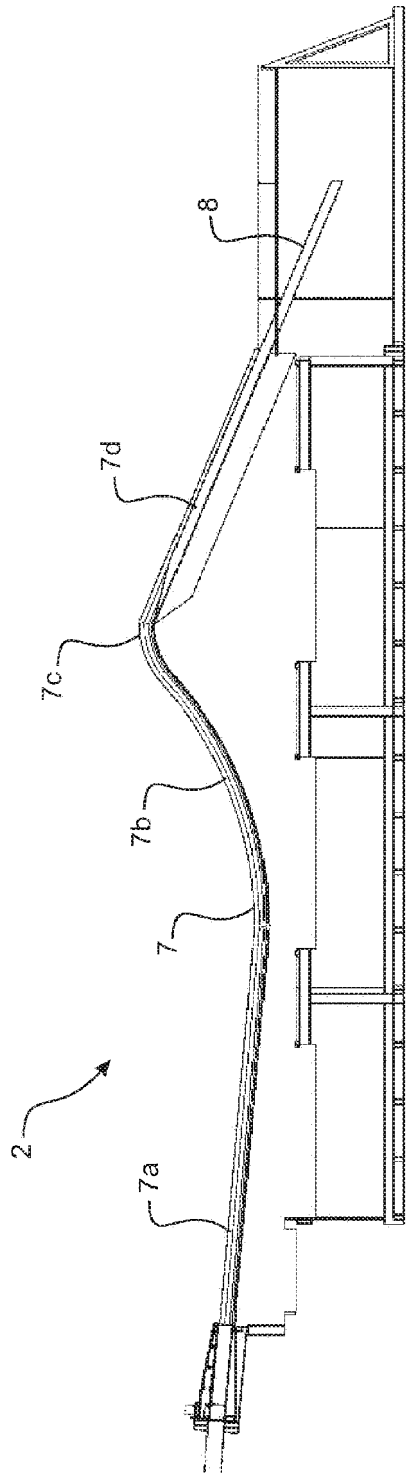


FIGURE 6

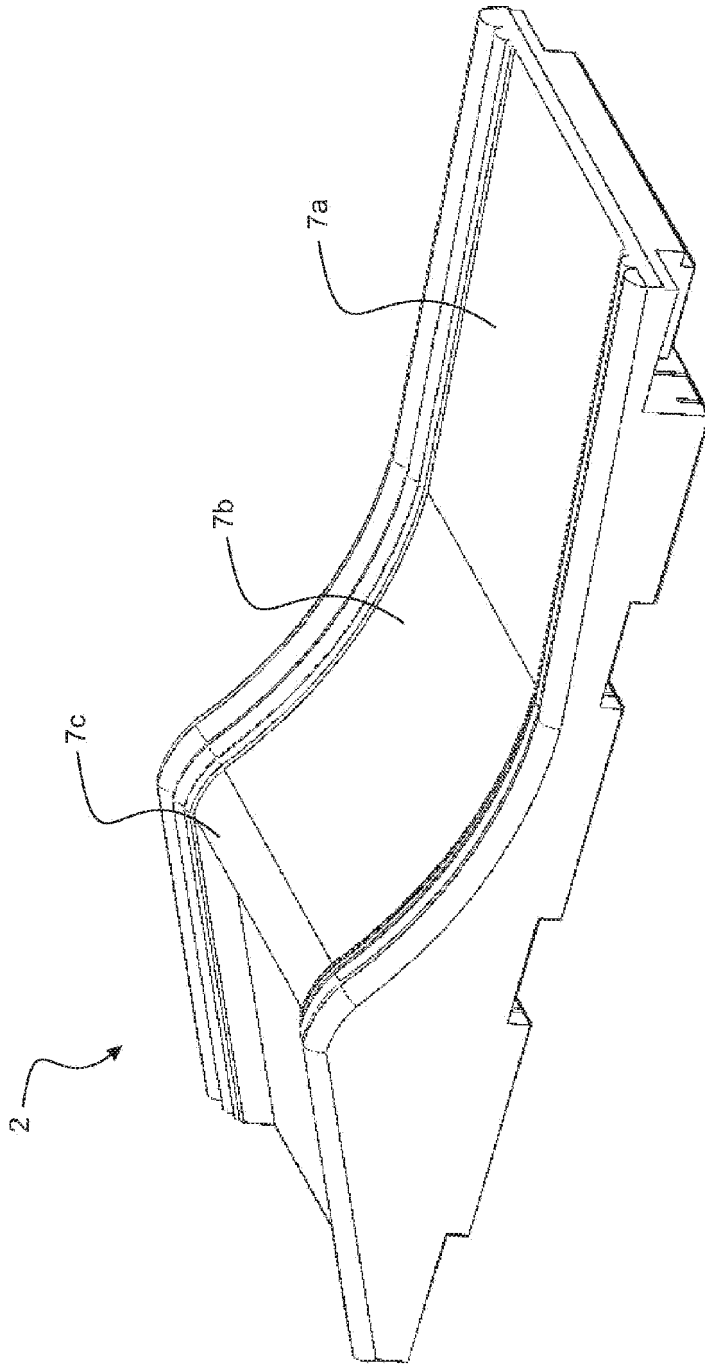


FIGURE 7

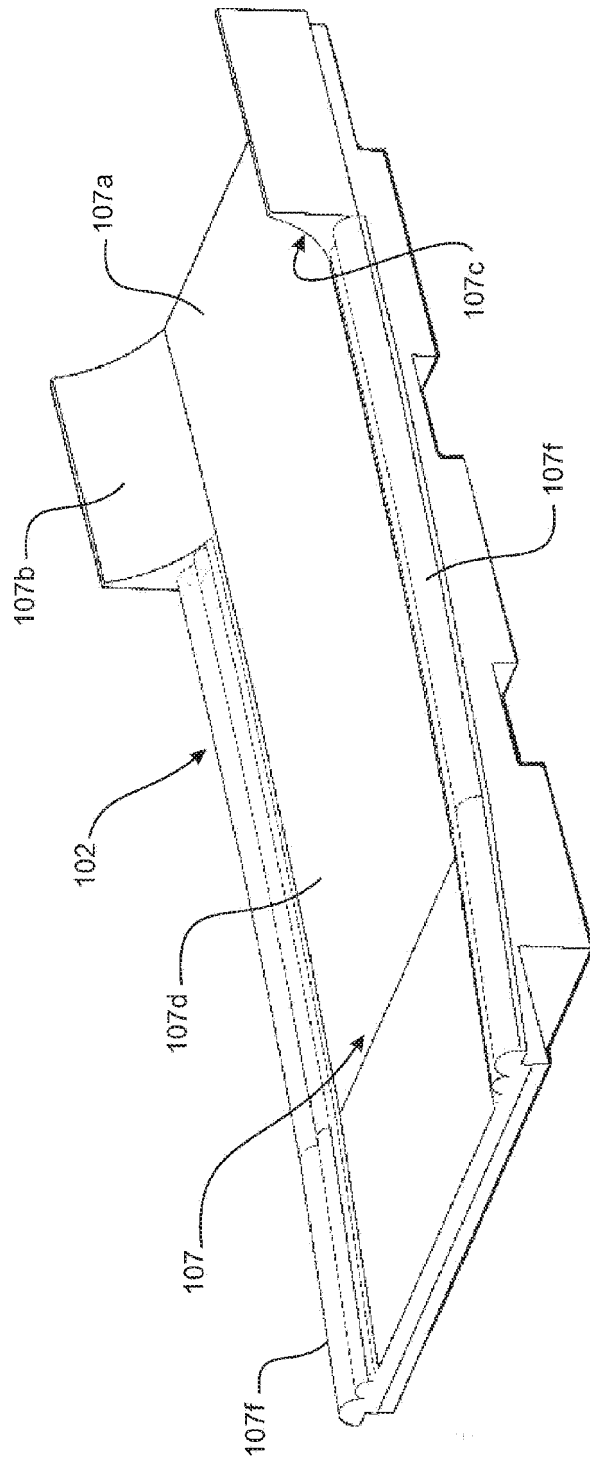


FIGURE 8

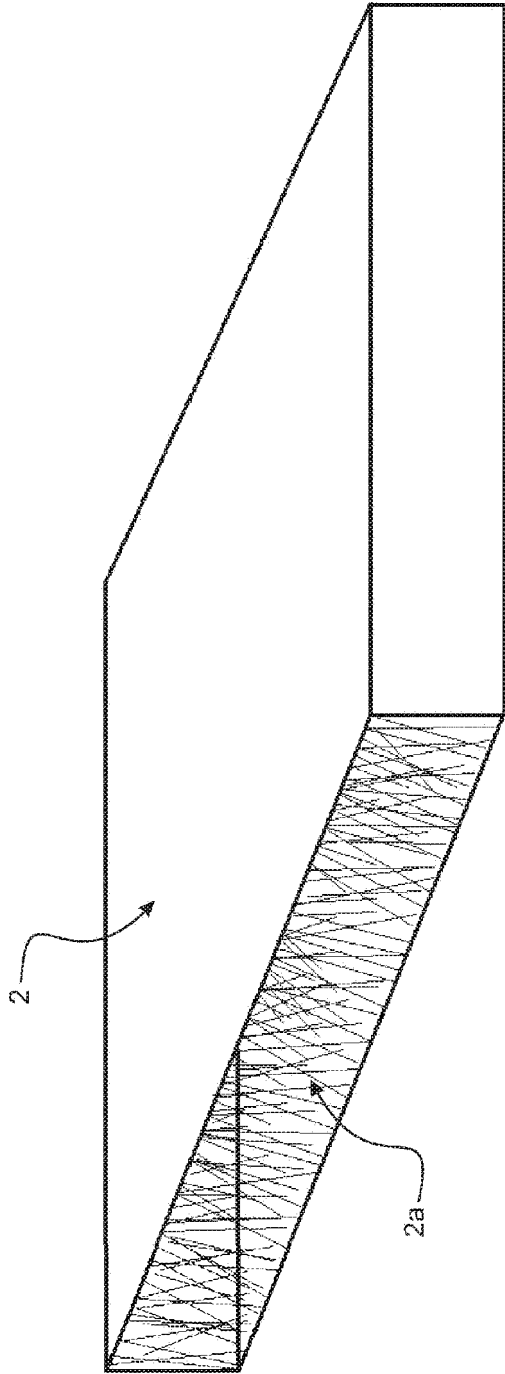


FIGURE 9

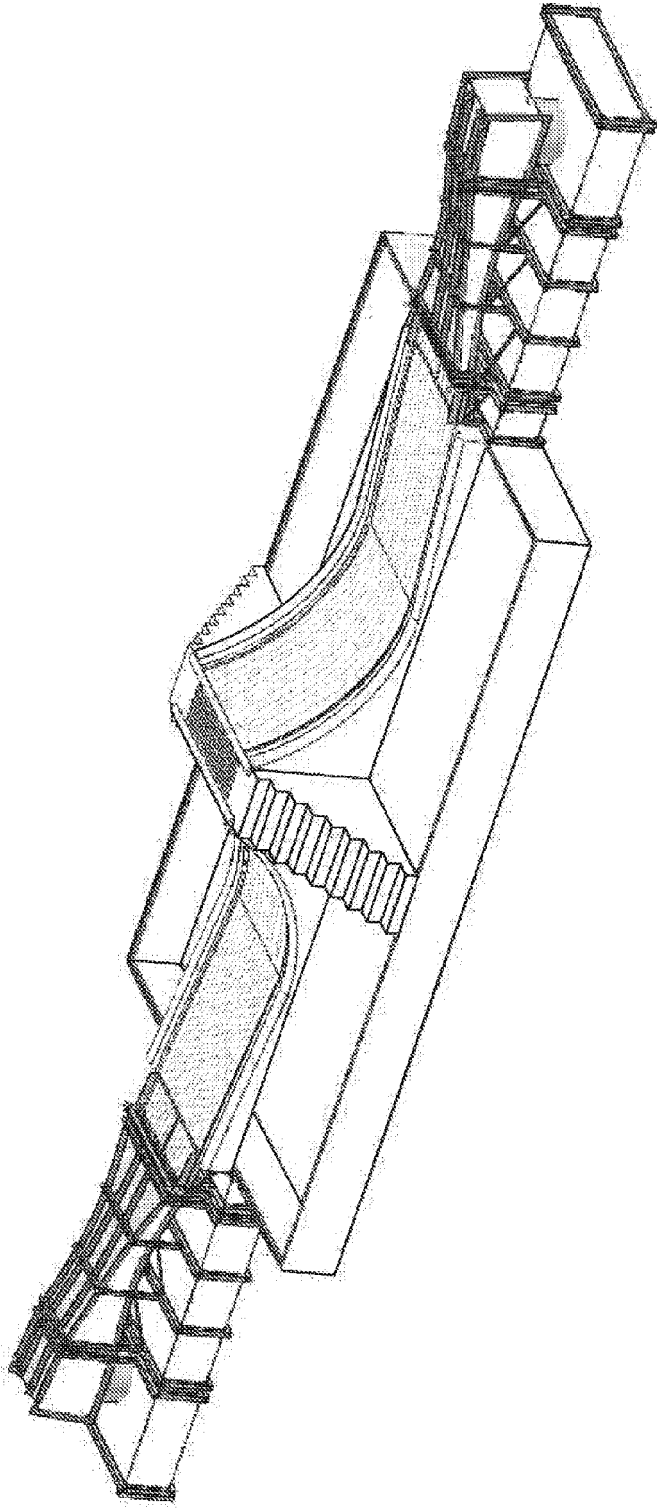


FIGURE 10

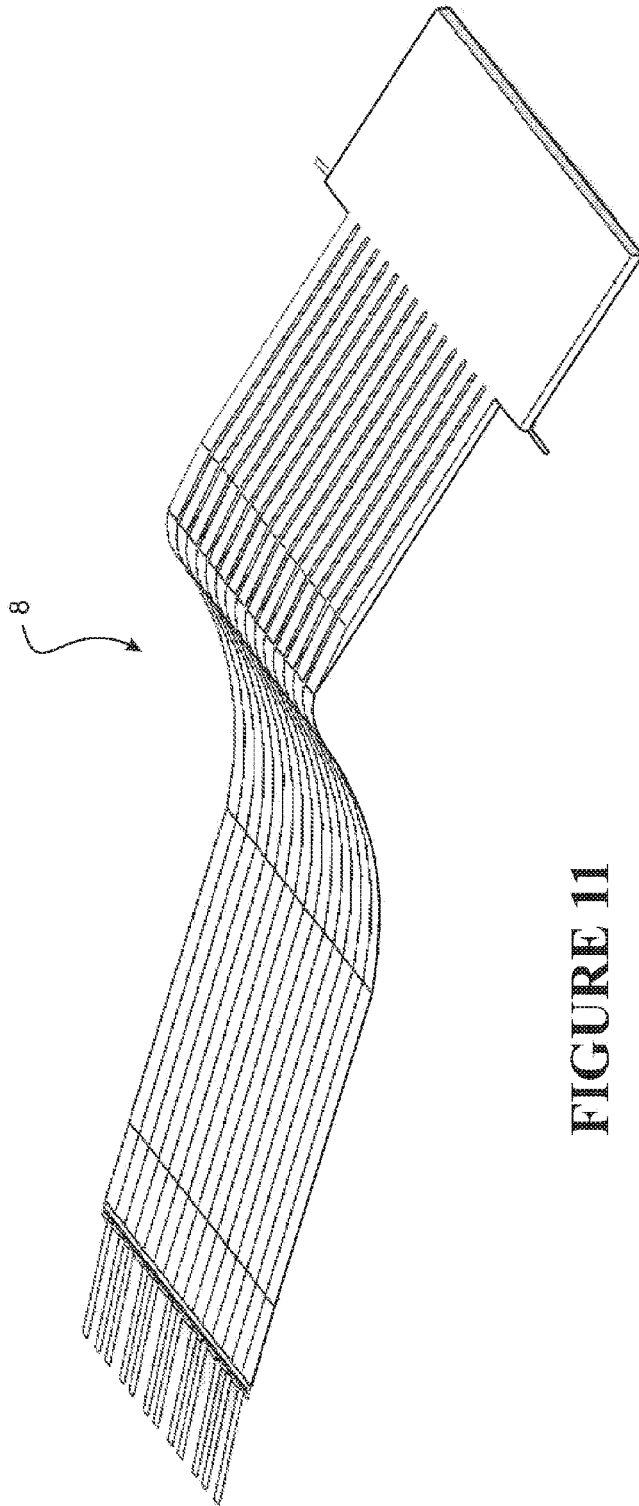


FIGURE 11

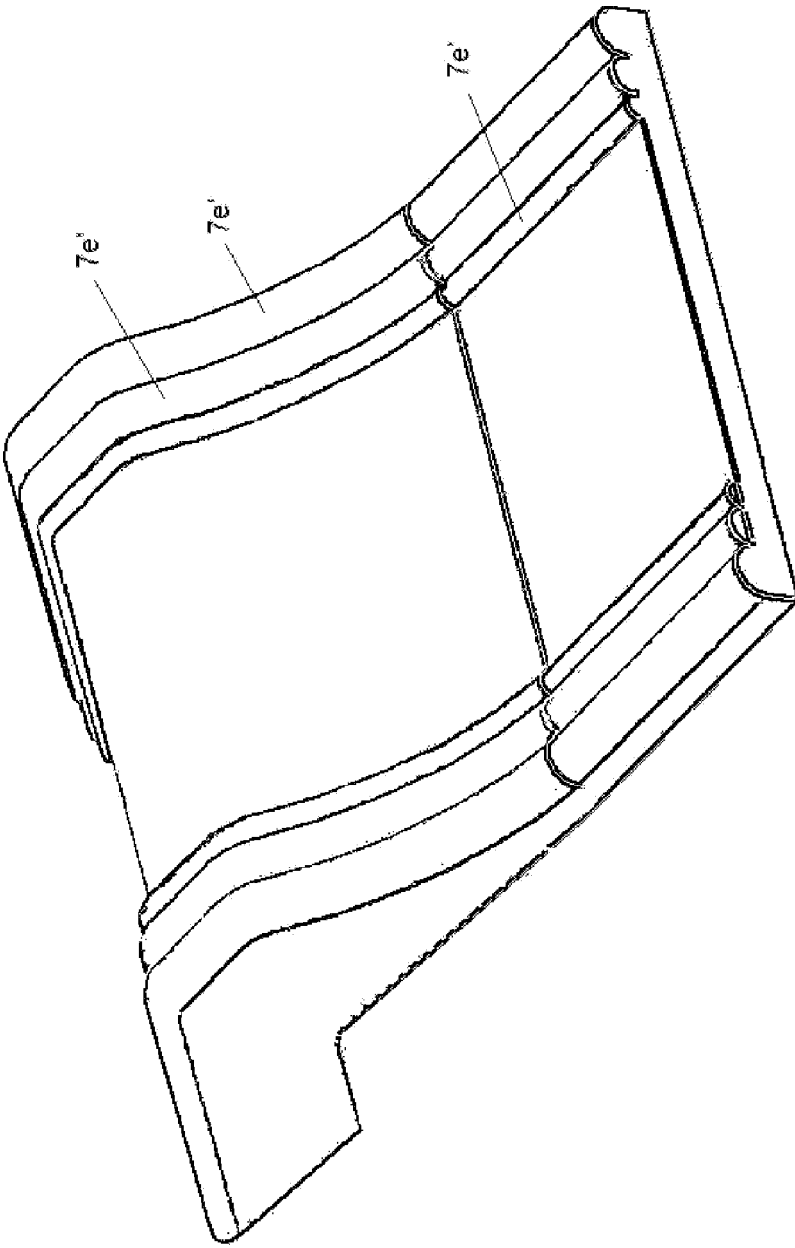


FIGURE 12

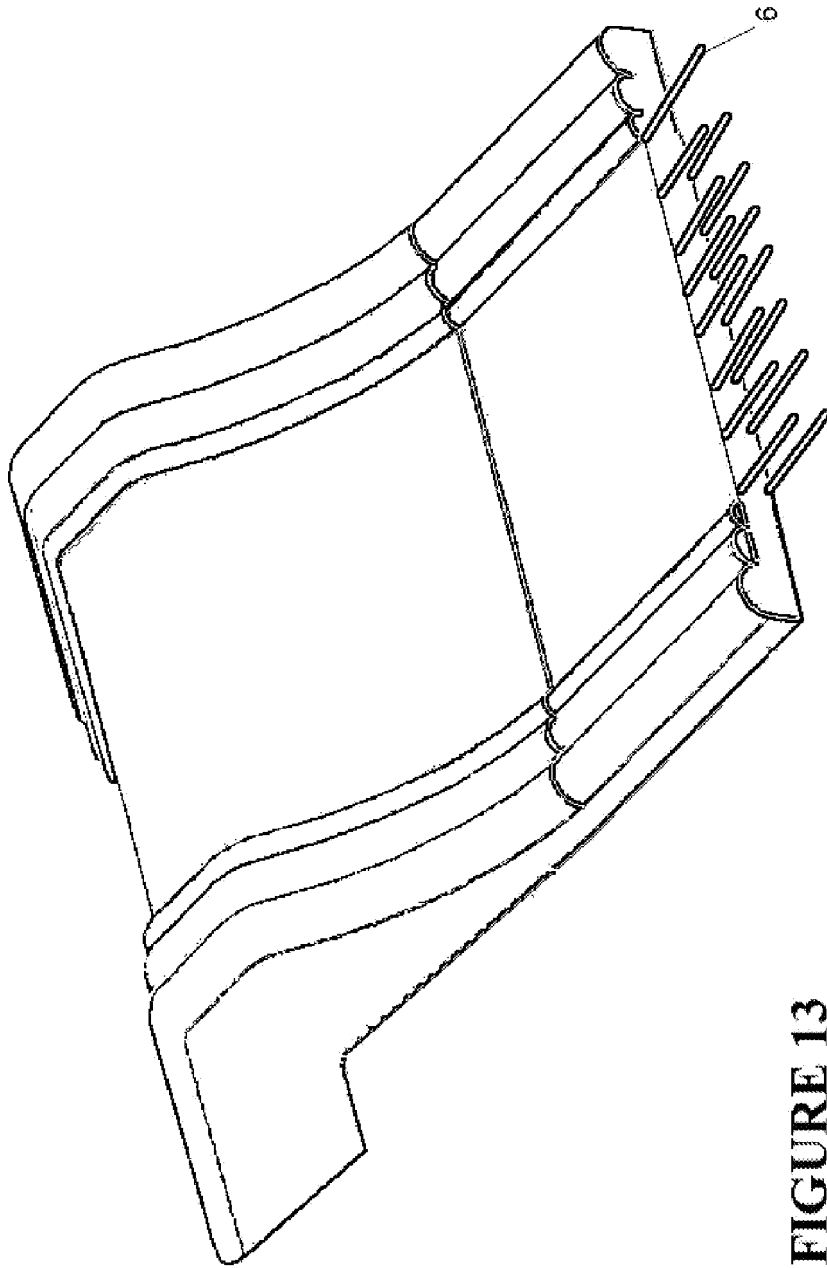


FIGURE 13

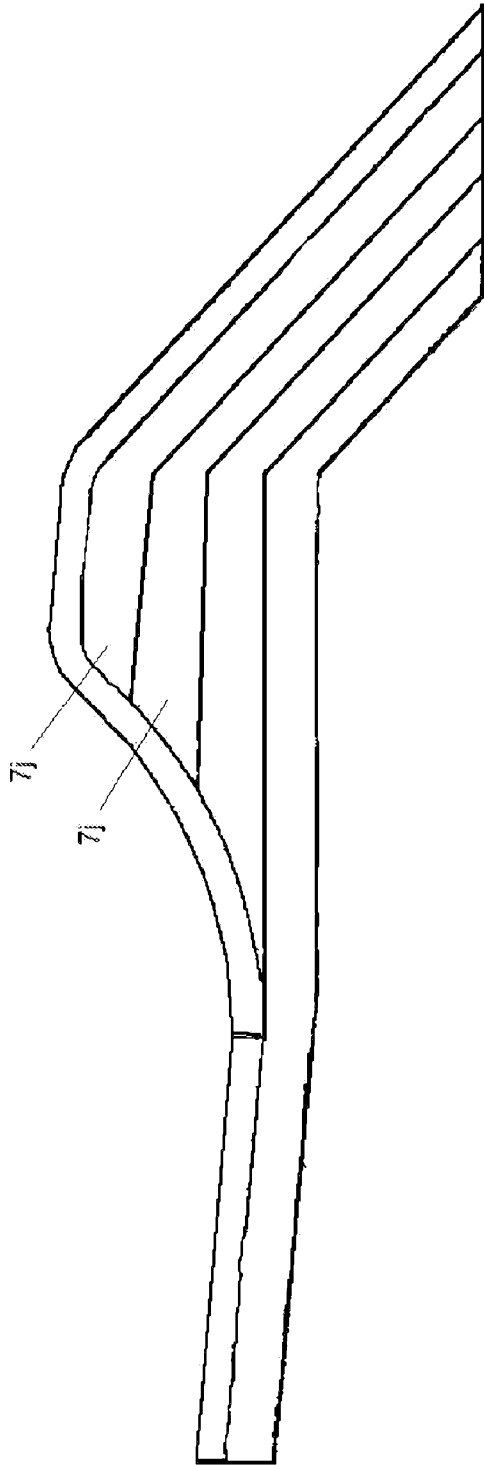


FIGURE 14