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(54) **Water ride attraction arrangement and method of assembly**

(57) A water ride attraction arrangement according to the present invention comprises a ride volume (120) providing a ride surface (121) and a water guiding means (200) for providing a jet of water (390) to the ride surface.

The water is taken from a water volume (190). The ride volume is suitable for floating on the water volume and for aligning the ride surface with the water surface (191) of the water volume.

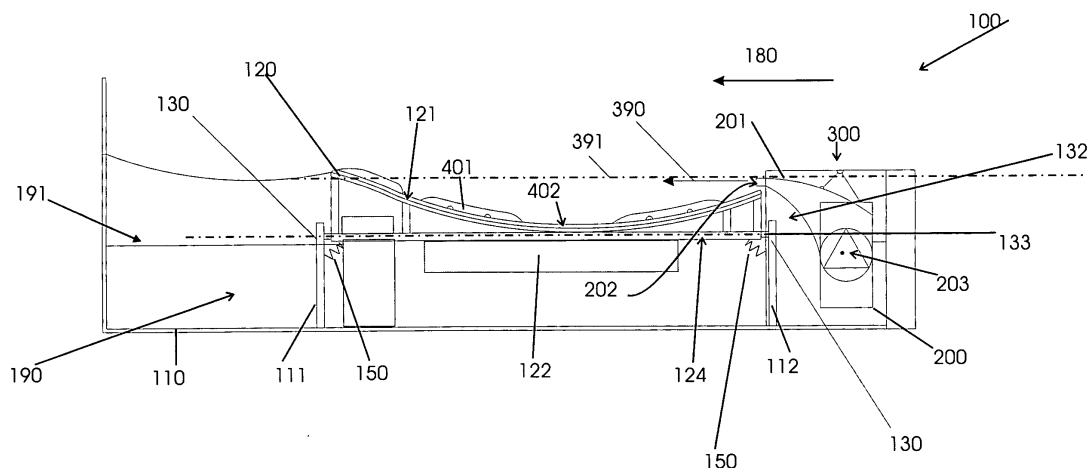


Fig 1

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Description

Technical field of the invention

[0001] The present invention relates to a water ride arrangement for use as an attraction such as mobile water ride attraction, more particular to a water ride arrangement having a jet of water provided to a ride surface, allowing a rider to make e.g. water-skimming manoeuvres on the jet of water. The present invention further relates to methods to align parts of the water ride attraction arrangement, more in particular to aligning parts of a mobile water ride attraction arrangement.

Background of the invention

[0002] A mobile water ride attraction having a jet of water provided to a ride surface, allowing rider to make water-skimming manoeuvres on the jet of water is disclosed in WO01/008770. The mobile water ride attraction comprises a plurality of transportable modules, also referred to as containers, which, after assembly, provide a water ride attraction. The attraction comprises a frame suitable for holding a water volume, which frame is constituted by the plurality of containers coupled to each other. The attraction further is provided with a ride surface, being an assembled number of modules. The attraction further comprises a number of water pumping means providing each a jet of water on the ride surface. This causes a super-critical flow of water on the surface upon which the rider can make water-skimming manoeuvres.

Summary of the invention

[0003] An object of the present invention is to provide a good water ride arrangement for use as an attraction such as mobile water ride attraction, more particularly, a good water ride attraction arrangement having a jet of water provided to a ride surface, allowing a rider to make e.g. water-skimming manoeuvres on the jet of water. Another object of the present invention is to provide a method to align parts of the water ride attraction arrangement, more in particular to align parts of a mobile water ride attraction arrangement.

[0004] The presently known water ride attractions having a ride surface have some drawbacks, which may be solved by the present invention. The creation of a well balanced water flow by the jet of water is important for the correct functioning of the attraction, allowing the riders to manoeuvre on the flow of water.

[0005] It has been found that the jet of water, provided by a water guiding means to the ride surface via the nozzle of a water conduit along one side of the ride surface, can be negatively influenced by misalignment, e.g. misalignment of the outlet aperture of the nozzle with respect to the ride surface, misalignment of the ride surface itself and/or a misalignment of the water guiding means itself.

[0006] More particular, a ride surface according to the

present invention is for use in an aligned position with respect to the horizontal plane. Also the nozzle or outlet aperture is provided aligned with the ride surface and/or with the horizontal. Any or a significant deviation of the alignment may cause the jet of water, hence the flow of water, to be disturbed and deviate from the intended flow of water to be created.

[0007] The prevention of deviation is important especially when the water ride attraction is mobile. Each time the mobile water ride attraction is to be installed, the alignment of the complete attraction requires time to be adjusted precisely, in order to allow the users of the attraction to enjoy most of the manoeuvres made on the attraction during riding. Also in case water ride attractions are provided with alternative ride surfaces, such an alignment is to be done, also in case of permanent constructions. In case of a mobile water ride attraction again the whole attraction is to be aligned, which is a time consuming action.

[0008] The present invention provides a method for aligning different parts of a water ride attraction, preferably a mobile water ride attraction. The present invention also provides a water ride attraction arrangement which comprises parts which can be aligned easily and quickly.

[0009] The above objective is accomplished by a method and device according to the present invention.

[0010] According to a first aspect of the present invention, a water ride attraction arrangement comprises a ride volume providing a ride surface and a water guiding means for providing a jet of water to the ride surface. The water is taken from a water volume. The ride volume is suitable for floating on the water volume and for aligning the ride surface with the water surface of the water volume.

[0011] According to some embodiments of the present invention, the ride volume may have an upper side providing the ride surface and a lower side opposite to the upper side, the ride volume comprising at least one float being present at the lower side of the ride volume.

[0012] According to some embodiments of the present invention, the water ride attraction arrangement further may comprise a frame suitable for holding a water volume having a water surface.

[0013] According to some embodiments of the present invention, the arrangement further may comprise a ride volume locking means able to change between locked and unlocked conditions, the ride volume locking means in locked condition locking the ride volume in a fixed relative position to the frame, the ride volume locking means in unlocked condition allowing the ride volume to move relative to the frame due to the floating of the ride volume on the water surface.

[0014] The water ride attraction arrangement further may comprise at least one nozzle for emitting a jet of water to the ride surface

[0015] The water ride attraction arrangement according to the first aspect of the present invention has the advantage that the ride surface is aligned with the water

surface within acceptable tolerances. As a consequence, the ride surface is also aligned within tolerances with the vertical or direction of gravity. The alignment may be obtained quite easily and is substantially always accurate. As the water surface is independent of the position of the frame or the attraction arrangement, the alignment and position of the ride surface is a constant and independent of the location where the water ride attraction arrangement is placed or constructed. The alignment and position of the ride surface once locked by the ride volume locking means, may serve as orientation for the other parts of the water ride attraction arrangement, such as e.g. the nozzle via which a jet of water is provided on the surface.

[0016] The water ride attraction arrangement according to the first aspect of the present invention has the advantage that the ride surface is aligned with the water surface within acceptable tolerances in a simple and efficient way. Hence time losses due to aligning of the water ride attraction arrangement can be avoided or reduced. The water ride attraction arrangement according to the first aspect of the present invention allows quick and easy removal and mounting of a ride volume, e.g. for maintenance of the ride volume, in particular the ride surface. The water ride attraction arrangement according to the first aspect of the present invention also allows quick and easy replacing of a first ride volume by a second, identical or different ride volume, having an identical or different ride surface.

[0017] The ride volume locking means may be any suitable system to prevent the ride volume to move relative to the frame when mechanical forces due to riding the attraction arrangement are applied to the ride surface.

[0018] Alternatively, by providing the float volume of the ride volume sufficiently large, i.e. sufficiently wide and/or deep, the floating of the ride volume may be stable enough to allow riding on the surface without a ride volume locking means.

[0019] According to some embodiments of the present invention, the ride volume locking means may comprise at least a first hinge, the frame and the ride volume being coupled to each other by the first hinge when the ride volume locking means is in unlocked condition. This first hinge allows rotation of the frame and ride volume round a first axis of rotation.

[0020] According to some embodiments of the present invention, the ride volume locking means comprises a first hinge and a second hinge, the frame and the ride volume being coupled to each other by the first and second hinges when the ride volume locking means is in unlocked condition. The first hinge allows rotation of the frame and ride volume round a first axis of rotation, the second hinge allowing rotation of the frame and ride volume round a second axis of rotation, the second axis of rotation coinciding with the first axis of rotation.

[0021] It has been found that, especially in case the ride surface has a longitudinal direction substantially parallel with the flow direction of the water flow, i.e. the di-

rection of the water jet, the provision of ride volume able to align the ride surface, using one or more floats, by rotation about an axis parallel to the flow direction is sufficient to provide a stable water flow on the ride surface. It has been found that a small vertical inclination may be tolerated.

[0022] According to some embodiments of the present invention, the ride volume locking means may comprise a means for aligning the first axis parallel to the water surface

[0023] According to some embodiments of the present invention, at least one of the hinges is a ball-and-socket hinge.

[0024] Small vertical inclination may be compensated by bringing the first axis parallel to the water surface. This may be done manually. The provision of ball-and-socket hinges of hinges having two axes of rotation can provide such compensation by means of using the ride volume floating on the water surface.

[0025] According to some embodiments of the present invention, the ride volume may comprise a first float and a second float, the first float being provided at a first side of the first axis, the second float being provided at the second side of the first axis. The first and second side can be opposite to each other. The provision of two or more floats in a configuration as set out above facilitates easy alignment of the ride surface by rotation about the axis.

[0026] According to some embodiments of the present invention, the arrangement may comprise at least one float, the at least one float is positionable at various places relative to the ride surface, for varying the alignment of the ride surface with the water surface. The provision of float which can be positioned at various places relative to the ride surface allows to easily change between more than one suitable alignment of the ride surface, e.g. in function of the level of skills of the rider, or in function of the manoeuvre to be made, which different manoeuvres or levels of skills may be exercised on the same ride surface, in function of the position of the surface.

[0027] According to some embodiments of the present invention, the water ride attraction arrangement further comprises at least one nozzle for emitting a jet of water to the ride surface, the at least one nozzle is in a fixed position with regard to the ride surface. According to some embodiments of the present invention, the water guiding means is in a fixed position with regard to the ride surface.

[0028] According to some embodiments of the present invention, the water ride attraction arrangement further may comprise:

- a frame suitable for holding a ride volume;
 - at least one water guiding means for providing a jet of water having a water jet direction to the ride surface,
- the arrangement further comprising a suspension system for rotatably coupling the water guiding

means onto the frame, the suspension system enables the water guiding means to rotate relative to the frame about a first axis being substantially parallel with the water jet direction.

[0029] The water guiding means can guide the water from a pumping means to the outlet aperture or nozzle. The water guiding means may itself comprise a water pump such as a submersible pump.

[0030] According to a second aspect of the present invention, a water ride attraction arrangement comprises:

- a ride volume providing a ride surface;
- a frame suitable for holding the ride volume;
- at least one water guiding means for providing a jet of water having a water jet direction to the ride surface,
- the arrangement further comprising a suspension system for rotatably coupling the water guiding means onto the frame, the suspension system enables the water guiding means to rotate relative to the frame about a first axis being substantially parallel with the water jet direction.

[0031] According to embodiments of the present invention, the suspension system may have one suspension point, the suspension system allows the suspension point and the gravity point to align under gravity force in direction of gravity.

[0032] According to embodiments of the present invention, the arrangement further may comprise a water guide locking means able to change between locked and unlocked condition. The water guide locking means in locked condition locks the water guiding means in a fixed relative position to the frame. The water guide locking means in unlocked condition allows the water guiding means to move relative to the frame due to the hanging of the water guiding means on the frame by said suspension system.

[0033] The nozzle providing the outflow aperture. The aperture may be in a fixed position with regard to the point of gravity of the water pumping means, hence with the line coupling the point of gravity with the one hinging point.

[0034] According to embodiments of the present invention, the suspension system may comprise a ball-and-socket hinge. According to embodiments of the present invention, the suspension system may comprise a hook fixed to the water guiding means. The suspension system further may comprise an eyelet fixed to the frame, the eyelet receiving the hook when the water guiding means is hung onto the frame.

[0035] According to embodiments of the present invention, the suspension system may comprise a hook fixed to the frame. The suspension system further may comprise an eyelet fixed to the water guiding means, the eyelet receiving the hook when the water guiding means is hung onto the frame.

[0036] According to embodiments of the present invention, the suspension system further may comprise means to change the distance between water guiding means and frame in direction of gravity.

5 **[0037]** According to embodiments of the present invention, the suspension system may comprise a first hinge for enabling the water guiding means to rotate relative to the frame about the first axis and a second hinge suitable to rotate about a second axis, the first axis and second axis being non-intersecting and non-parallel.

10 **[0038]** The water ride attraction arrangement according to this second aspect of the present invention has the advantage that, due to natural force, i.e. the gravity force, the water guiding means is aligned with the vertical. The position of the point of gravity and the suspension point, together with the suspension system, makes the water guiding means to be always positioned according to the direction of gravity in a well-defined alignment, independent of the position or the location where the water attraction arrangement is placed. In case the nozzle providing the outlet aperture is in a fixed position and orientation with regard to the point of gravity, the outlet aperture is always aligned with regard to the direction of gravity, i.e. the vertical and thus also with regard to any water surface, which may be created within the water ride attraction arrangement. This alignment may be secured by providing the water guide locking means in its locked position.

25 **[0039]** A water ride attraction arrangement having the features according to the first and second aspect of the present invention, has the advantage that both the ride surface and the water guiding means, possibly having a nozzle and outlet aperture in fixed position and orientation to the water guiding means, are aligned with both the vertical, i.e. the direction of gravity and the water surface provided within the frame of the water ride attraction arrangement. These alignments are obtained independently one from the other, still are always tuned to each other since the points of reference for both alignments is the system of coordinates of the vertical and the plane defined by the water surface, i.e. plane perpendicular to the vertical.

40 **[0040]** One possible misalignment, which may need additional attention, is the altitude of the ride surface and the outlet aperture, i.e. the position along the vertical. When the suspension system further comprises means to change the distance between water guiding means and frame in direction of gravity, this misalignment may also be compensated. As an alternative, the volume of water used during alignment of the ride surface may be adjusted, i.e. increased or decreased, to vary the altitude of the ride surface when floating, i.e. with ride volume locking means in unlocked position.

55 **[0041]** It was found that by aligning of the water guiding means about the axis parallel to the water jet direction, the water guiding means e.g. comprising the nozzle with an aperture via which the flow of water is provided to the ride surface, the water flow or jet of water on the ride

surface can be stabilised to a large extent. This alignment of the water guiding means with the frame may align the water guiding means relative to the ride volume held by the frame. Especially in case the ride volume can be aligned to the water surface by means of a floating ride volume according to the first aspect of the present invention, the further alignment of the water guiding means by allowing an alignment by rotation along an axis parallel to the direction of the water jet is beneficial and enables to provide a stable jet of water and a stable water flow in the ride surface. The rotation about the axis of the water guiding means may be caused by gravitational forces, bringing the point of gravity of the water guiding means in the plane defined by the vertical and the axis of rotation. This alignment may be obtained quite easily and is substantially always accurate. As the water surface is independent of the position of the frame or the attraction arrangement, and the vertical is always perpendicular to this water surface, the alignment and position of the ride surface and the water guiding means is a constant and independent of the location where the water ride attraction arrangement is placed or constructed.

[0042] According to embodiments of the present invention, the water ride attraction arrangement according to the first and/or second aspect of the present invention may be a mobile water ride attraction arrangement.

[0043] According to a third aspect of the present invention, a mobile water ride attraction arrangement is provided wherein the arrangement comprising a ride volume providing a ride surface, a frame to hold the water volume and a water guiding means for providing a jet of water to the rides surface. The frame comprises a base section, the base section comprising a substantially rectangular planar centre area having a first longitudinal side and a second longitudinal side in longitudinal direction and a first widthwise side and a second widthwise side in widthwise direction. The centre area defines an upright direction being perpendicular to both widthwise direction and longitudinal direction. The frame further comprises:

- a first planar side extension area being coupled to the centre area along the first longitudinal side, the first planar side extension area being moveably connected to the planar centre area along the first longitudinal side;
- a second planar side extension area being coupled to the centre area along the second longitudinal side, the second planar side extension area being moveably connected to the planar centre area along the second longitudinal side.

[0044] According to embodiments of the present invention, the first planar side extension area may be rotatable along the longitudinal side; the second planar side extension area may be rotatable along the second longitudinal side.

[0045] The widthwise direction may be understood as substantially perpendicular to the longitudinal direction

[0046] The first and second planar side extension area may be rotatable along the first respectively the second longitudinal side to bring the first planar side extension area parallel to the upright direction. The first and second planar side extension area may be rotatable to bring the first and second extension area coplanar with the base section, or may only be rotatable to provide the first and second extension area being under an angled position relative to the base section.

[0047] According to embodiments of the present invention, the arrangement further may comprise

- a third planar side extension area being coupled to the centre area along the second widthwise side, the third planar side extension area being moveably connected along the second widthwise side;
- a planar endplate being coupled to the first widthwise side along the first widthwise side and being parallel to the upright direction.

[0048] The third planar side extension area may preferably be rotatably connected along the second widthwise side to bring the third planar side extension area parallel to the upright direction by rotating about the second widthwise side.

[0049] According to embodiments of the present invention, the first planar side extension area, second planar side extension area, third planar side extension area when placed parallel in upright direction and the planar end plate and centre area may define a container.

[0050] According to embodiments of the present invention, the first planar side extension area, second planar side extension area and the third planar side extension area may have substantially rectangular shapes. Possibly the side of the rectangular shapes perpendicular to the sides of the rectangular shapes coupled to the centre area may have identical lengths.

[0051] According to embodiments of the present invention, the planar end plate may have a substantially rectangular shape, the side of the rectangular shape perpendicular to the first widthwise side of the centre area having a length identical to the length of the side of the rectangular shapes of the third side extension area perpendicular to the sides of the rectangular shapes coupled to the centre area.

[0052] According to embodiments of the present invention, the first planar side extension area may be provided with a first substantially rectangular plate member coupled along the side of the rectangular shape in longitudinal direction, which side is not coupled to the centre area. The first planar side extension area and the first plate member may be suitable to be positioned under an angle for providing the planar centre area and the first plate member oriented substantially perpendicular. Similarly, the second planar side extension area may be provided with a second substantially rectangular plate member coupled along the side of the rectangular shape in longitudinal direction, which side is not coupled to the

centre area. The second planar side extension area and the second plate member may be suitable to be positioned under an angle for providing the planar centre area and the second plate member oriented substantially perpendicular.

[0053] According to embodiments of the present invention, the side of the substantially rectangular first plate member perpendicular to the first planar side extension area having a first length, the side of the substantially rectangular second plate member perpendicular to the second planar side extension area having a second length, the first length and said second length may be less than or equal to the largest distance in vertical direction between ride surface and base section. Possibly the sum of the first length and the second length may be equal to the dimension of the centre area in widthwise direction.

[0054] According to embodiments of the present invention, the attraction arrangement may comprise a machine room having a substantially cubic volume, said planar endplate constituting one of the sides of the cubic volume.

[0055] According to embodiments of the present invention, the attraction arrangement may comprise a machine room having a substantially cubic volume and a planar endplate being coupled to the first widthwise side along the first widthwise side and being parallel to the upright direction. The planar endplate may constitute one of the sides of the cubic volume.

[0056] The arrangement according to the third aspect of the present invention has the advantage that the water ride attraction arrangement can be unfolded thereby providing a mobile water ride attraction arrangement, whereas in folded position, the elements of the water ride attraction arrangement provide a container in which all parts necessary to put the attraction arrangement in operation (except the water volume) can be stored and transported. The elements of the attraction arrangement may be so dimensioned that the over-all dimensions of the attraction arrangement when folded, match standards container dimensions. The mobile water ride attraction arrangement only requires one mobile element to be transported. In case the water ride attraction arrangement is provided with the features of the attraction arrangement according to the first and/or the second aspect of the invention, the attraction arrangement can easily and quickly be positioned, aligned and set to operation.

[0057] According to embodiments of the present invention, the water ride attraction arrangement is mounted on a trailer. According to embodiments of the present invention, the water ride attraction arrangement may be suitable to be displaced by means of a trailer.

[0058] The mobile water ride attraction arrangement may be permanently fixed, i.e. make part of a trailer, or can be a container suitable to be mounted on a trailer, e.g. placed on a trailer by a crane or a similar lifting unit. The mobile water ride attraction arrangement may be displaced on a trailer, or by means of a train, boat airplane

or any other suitable means.

[0059] According to embodiments of the present invention, the arrangement comprising a means for aligning the ride surface with the water surface of the water volume. The means for aligning the ride surface with the water surface of the water volume may be a means for moving the ride volume relative to the frame for aligning the ride surface with the water surface of the water volume.

[0060] According to embodiments of the present invention, the water guiding means may comprise at least one nozzle for providing the jet of water in a water jet direction, the arrangement comprising a means to adjust the orientation of the ride volume relative to the nozzle about an axis of rotation substantially parallel with said water jet direction.

[0061] Using mobile water ride attraction arrangements, often disturbance of the water flow and the jet of water provided to the ride surface is noticed when the mobile water ride attraction arrangement is displaced to other locations. It was found that this is due to insufficient alignment of ride volume and water guiding means comprising the nozzle to create the jet of water on the ride surface via one or more apertures. The provision of a means to adjust the orientation of the ride volume relative to the frame, and preferably also relative to the nozzle about an axis of rotation substantially parallel with said water jet direction reduces the disturbance of the water flow.

[0062] The means to adjust the orientation of the ride volume relative to the nozzle about an axis of rotation substantially parallel with said water jet direction may be a ride volume being suitable for floating on the water volume and for aligning the ride surface with the water surface of the water volume according to the first aspect of the present invention. Alternatively and/or additionally, the water ride attraction arrangement comprising a frame, the means may be suitable to adjust the orientation of the ride volume relative to the nozzle about an axis of rotation substantially parallel with said water jet direction. Therefore the means may comprise a suspension system for rotatably coupling the water guiding means onto the frame, the suspension system enables the water guiding means to rotate relative to the frame about a first axis being substantially parallel with the water jet direction, according to the second aspect of the present invention. The means may also allow to rotate the ride volume to rotate about an axis parallel to the direction of the water jet, independent of the orientation of the water guiding means about this axis.

[0063] Preferably, the mobile water ride attraction arrangement has both a ride volume being suitable for floating on the water volume and a suspension system for rotatably coupling the water guiding means onto the frame.

[0064] The mobile water ride attraction arrangement may comprise other features according to the first and/or second aspect of the present invention.

[0065] The presence of means to adjust the orientation of the ride volume relative to the nozzle about an axis of rotation substantially parallel with said water jet direction has the advantage that the trailer, on which the arrangement is mounted or the frame of the arrangement itself may be placed on uneven ground surfaces. The aligning of the orientation of the ride volume relative to the nozzle, in particular by rotating the ride volume and/or the water guiding means relative to an axis substantially parallel to the water jet direction, can be done substantially independent and more easily than aligning the frame and/or trailer itself.

[0066] According to a fourth aspect of the present invention, a method for aligning a ride surface of a water ride attraction arrangement is provided. The water ride attraction arrangement comprises a ride volume providing a ride surface, a water guiding means for providing a jet of water to the ride surface, the water being taken from a water volume, the ride volume being suitable for floating on the water volume and for aligning the ride surface with the water surface of the water volume.

[0067] The method comprises the steps of:

- providing a water volume having a water surface;
- aligning the ride surface with the water surface of the water volume by allowing the ride volume to float on the water volume.

[0068] According to embodiments of the present invention, the arrangement further comprise a frame for holding the water volume, a ride volume locking means able to change between locked and unlocked conditions, the ride volume locking means in locked condition locking the ride volume in a fixed relative position to the frame, the ride volume locking means in unlocked condition allowing the ride volume to move relative to the frame due to the floating of the ride volume on the water surface. The method further may comprise the steps of:

- providing a water volume into the frame,
- unlocking the ride volume so that the ride volume floats on the water surface, thereby aligning the ride surface with the water surface and with the frame, e.g. by bringing locking means into an unlocked condition; and
- locking the ride volume in a fixed relative position to the frame, e.g. by bringing the locking means into a locked condition.

[0069] According to embodiments of the present invention, the water ride attraction arrangement further comprises a suspension system for rotatably coupling the water guiding means onto the frame, the suspension system enabling the water guiding means to rotate relative to the frame about a first axis being substantially parallel with the water jet direction. The method may further comprise the steps of: unlocking the water guiding means, e.g. by having the water guide locking means in

unlocked condition, allowing the water guiding means to rotate relative to the frame about a first axis being substantially parallel with the water jet direction and locking the water guiding means, e.g. by bringing the water guide locking means into a locked condition, thereby locking the water guiding means in a fixed relative position to the frame.

[0070] According to a fifth aspect of the present invention, a mobile water ride attraction arrangement is provided, which comprises a ride volume providing a ride surface, a frame holding the ride volume and being suitable to hold a water volume. The arrangement further comprises a water guiding means for providing a jet of water to the ride surface. The arrangement further comprises an orientation adjustment unit for changing the orientation of the ride volume relative to the frame so as to aligning the ride volume.

[0071] According to embodiments of the present invention, the arrangement further may comprise a ride volume locking means able to change between locked and unlocked conditions. The ride volume locking means in the locked condition locks the ride volume in a fixed relative position to the frame, the ride volume locking means in unlocked condition allowing the ride volume to move relative to the frame.

[0072] According to a sixth aspect of the present invention, a method for aligning a ride surface of a mobile water ride attraction arrangement, in particular a mobile water ride attraction arrangement according to the fifth aspect of the present invention, is provided.

[0073] The mobile water ride attraction arrangement comprises a ride volume providing a ride surface, a frame holding the ride volume and being suitable to hold a water volume, and a water guiding means for providing a jet of water to the ride surface. The arrangement further comprises an orientation adjustment unit for changing the orientation of the ride volume relative to the frame so as to aligning the ride volume.

[0074] The method comprises the steps of

- mounting the frame of the arrangement onto a supporting surface; and
- aligning the ride volume by changing the orientation of the ride volume relative to the frame by the orientation adjustment unit.

[0075] The arrangement may further comprise a ride volume locking means. The method further may comprise the steps of :

- unlocking the ride volume prior to aligning the ride volume, e.g. by bringing the locking means into an unlocked condition, and
- locking the ride volume after aligning the ride volume, e.g. by bringing the ride volume into a locked condition .

[0076] The ride volume locking means is able to

change between locked and unlocked conditions, the ride volume locking means in locked condition locking the ride volume in a fixed relative position to the frame, the ride volume locking means in unlocked condition allowing the ride volume to move relative to the frame.

[0077] According to embodiments of the present invention, the method further may comprise the step of providing a water volume having a water surface in the frame prior to aligning the ride volume. Alternatively the provision of a water volume having a water surface in the frame is done after aligning the ride volume and possibly after bringing the ride volume in locked condition.

[0078] Mobile water ride attraction arrangements according to the fifth aspect and the methods to align mobile water ride attraction arrangements according to the sixth aspect of the present invention have the advantage that the ride surface may be aligned easily and substantially always accurately within tolerances with the vertical or direction of gravity independent of the position of the frame or the attraction arrangement. The alignment and position of the ride volume, hence of the ride surface, is independent of the location where the water ride attraction arrangement, more in particular the frame of the arrangement, is placed. The alignment and position of the ride surface, possibly locked by the ride volume locking means, may serve as orientation for the other parts of the water ride attraction arrangement, such as e.g. the nozzle via which a jet of water is provided on the surface.

[0079] Once the frame as a whole is stably mount on a surface at the location where the attracting arrangement is to be used, the ride surface by means of the ride volume can be aligned independently of the orientation of the frame. Surface conditions of the surface onto which the attraction arrangement is mount, have less or even no influence on the alignment of the ride volume.

[0080] The frame of the arrangement itself or, in case the arrangement is mount on a trailer, the trailer may be placed on uneven ground surfaces. The aligning of the orientation of the ride volume relative to the frame, can be done substantially independent and more easily than aligning the frame and/or trailer itself. Especially in case several ride volumes are used on the same arrangement, the ride volumes may be changed and aligned without the need to adjust the position of the frame or possibly the trailer.

[0081] It is understood that the mobile water ride attraction arrangement according to the fifth aspect of the present invention may be provided with some or all the features as set out relative to the water ride attraction arrangements according to the first, second and/or third aspect of the present invention, providing the same or similar advantages.

[0082] Particular and preferred aspects of the invention are set out in the accompanying independent and dependent claims. Features from the dependent claims may be combined with features of the independent claims and with features of other dependent claims as appropriate and not merely as explicitly set out in the claims.

[0083] Although there has been constant improvement, change and evolution of devices in this field, the present concepts are believed to represent substantial new and novel improvements, including departures from prior practices, resulting in the provision of more efficient, stable and reliable devices of this nature.

[0084] The above and other characteristics, features and advantages of the present invention will become apparent from the following detailed description, taken in conjunction with the accompanying drawings, which illustrate, by way of example, the principles of the invention. This description is given for the sake of example only, without limiting the scope of the invention. The reference figures quoted below refer to the attached drawings.

Brief description of the drawings

[0085]

Fig. 1 is side elevations of a water ride attraction according to an embodiment of the present invention.

Fig. 2 is top view of the water ride attraction of Figure 1.

Fig. 3 is detail of the coupling of water ride volume and frame of the water ride attraction of Figure 1 in accordance with an embodiment of the present invention.

Fig. 4 is another top view of the water ride attraction of figure 1.

Fig. 5 is a side view of the water ride attraction of Figure 1 in closed position.

Fig. 6 is a top view of the water ride attraction of Figure 1 in closed position.

Fig. 7 is a (detailed) cross-sectional view of the water guiding means coupled to the frame in accordance with an embodiment of the present invention.

Fig. 8 shows schematically a hydraulic ride volume locking means.

[0086] In the different figures, the same reference signs refer to the same or analogous elements.

45 Description of illustrative embodiments

[0087] The present invention will be described with respect to particular embodiments and with reference to certain drawings but the invention is not limited thereto but only by the claims. The drawings described are only schematic and are non-limiting. In the drawings, the size of some of the elements may be exaggerated and not drawn on scale for illustrative purposes. The dimensions and the relative dimensions do not correspond to actual reductions to practice of the invention.

[0088] Furthermore, the terms first, second, third and the like in the description and in the claims, are used for distinguishing between similar elements and not neces-

sarily for describing a sequence, either temporally, spatially, in ranking or in any other manner. It is to be understood that the terms so used are interchangeable under appropriate circumstances and that the embodiments of the invention described herein are capable of operation in other sequences than described or illustrated herein.

[0089] Moreover, the terms top, bottom, over, under and the like in the description and the claims are used for descriptive purposes and not necessarily for describing relative positions. It is to be understood that the terms so used are interchangeable under appropriate circumstances and that the embodiments of the invention described herein are capable of operation in other orientations than described or illustrated herein.

[0090] It is to be noticed that the term "comprising", used in the claims, should not be interpreted as being restricted to the means listed thereafter; it does not exclude other elements or steps. It is thus to be interpreted as specifying the presence of the stated features, integers, steps or components as referred to, but does not preclude the presence or addition of one or more other features, integers, steps or components, or groups thereof. Thus, the scope of the expression "a device comprising means A and B" should not be limited to devices consisting only of components A and B. It means that with respect to the present invention, the only relevant components of the device are A and B.

[0091] Similarly, it is to be noticed that the term "coupled", also used in the claims, should not be interpreted as being restricted to direct connections only. The terms "coupled" and "connected", along with their derivatives, may be used. It should be understood that these terms are not intended as synonyms for each other. Thus, the scope of the expression "a device A coupled to a device B" should not be limited to devices or systems wherein an output of device A is directly connected to an input of device B. It means that there exists a path between an output of A and an input of B which may be a path including other devices or means. "Coupled" may mean that two or more elements are either in direct physical or electrical contact, or that two or more elements are not in direct contact with each other but yet still co-operate or interact with each other.

[0092] Reference throughout this specification to "one embodiment" or "an embodiment" means that a particular feature, structure or characteristic described in connection with the embodiment is included in at least one embodiment of the present invention. Thus, appearances of the phrases "in one embodiment" or "in an embodiment" in various places throughout this specification are not necessarily all referring to the same embodiment, but may. Furthermore, the particular features, structures or characteristics may be combined in any suitable manner, as would be apparent to one of ordinary skill in the art from this disclosure, in one or more embodiments.

[0093] Similarly it should be appreciated that in the description of exemplary embodiments of the invention, various features of the invention are sometimes grouped

together in a single embodiment, figure, or description thereof for the purpose of streamlining the disclosure and aiding in the understanding of one or more of the various inventive aspects. This method of disclosure, however, is not to be interpreted as reflecting an intention that the claimed invention requires more features than are expressly recited in each claim. Rather, as the following claims reflect, inventive aspects lie in less than all features of a single foregoing disclosed embodiment. Thus, the claims following the detailed description are hereby expressly incorporated into this detailed description, with each claim standing on its own as a separate embodiment of this invention.

[0094] Furthermore, while some embodiments described herein include some but not other features included in other embodiments, combinations of features of different embodiments are meant to be within the scope of the invention, and form different embodiments, as would be understood by those in the art. For example, in the following claims, any of the claimed embodiments can be used in any combination.

[0095] Furthermore, an element described herein of an apparatus embodiment is an example of a means for carrying out the function performed by the element for the purpose of carrying out the invention.

[0096] In the description provided herein, numerous specific details are set forth. However, it is understood that embodiments of the invention may be practiced without these specific details. In other instances, well-known methods, structures and techniques have not been shown in detail in order not to obscure an understanding of this description.

[0097] The following terms are provided solely to aid in the understanding of the invention.

[0098] The term "water" in the context of this invention is to be understood broadly and means any suitable liquid, such as water, coloured water, coloured liquids, liquid mixtures, whether drinkable or not which are suitable to be provided as a flow on the ride surface to allow riders to make manoeuvres on.

[0099] A "hinge" is understood as a mechanical device that connects two solid objects, allowing rotation between the two solid objects.

[0100] The term "aligning" of an object is to be understood as bringing the object in a predetermined position relative to the horizontal and vertical.

[0101] The term 'in fixed position' means that the elements or parts are coupled one to the other so the relative position cannot be changed under normal working conditions. It does not intend to mean that "parts being fixed" cannot be disconnected or dismantled.

[0102] The "suspension point" of the water guiding means is the point where the suspension system contacts the water guiding means.

[0103] An area "coupled to a side along the side" is to be understood as the area extending all along the length of the side to which it is coupled.

[0104] In the context of the water ride attractions, a

number of typical terms are listed in WO01/008770. Identical or similar terms are to be understood in the same or similar way for the present invention. However, the explanations given hereafter is to be understood as in addition to the ordinary meaning of such terms. They are not intended to be limiting with respect thereto. Such terms are listed hereafter.

[0105] The term "deep water flow" is a flow which has sufficient depth for having the pressure disturbance from the rider and his or her vehicle not significantly being influenced by the presence of the bottom over which a body of water flows.

[0106] The term "sheet flow" or "shallow flow" is to be understood as a thin flow of water that has sufficient depth to allow water skimming manoeuvres, but which depth still allows the pressure disturbance from the rider and his or her vehicle to be significantly influenced by the presence of the bottom over which a body of water flows. The later effect is also referred to as the 'ground effect'.

[0107] A "water volume" is a volume of water contained in the water ride attraction, more particular in the frame of it. The flow of water in the water ride surface is the constantly changing body of water moving in a flow direction, having a length, breadth and depth sufficient to permit water skimming manoeuvres thereon, which manoeuvres are determined by the respective type of flow, i. e., deep water or sheet flow.

[0108] Water skimming manoeuvres are manoeuvres to be performed on a flowing body of water upon a section of the ride surface, usually an inclined section, including the riding across the face of the surface of water; riding horizontal or at an angle with the flow of water; riding down a flow of water upon an inclined surface counter-current to the flow moving up said incline; manipulating the planing body to cut into the surface of water so as to carve an upwardly arcing turn; riding back up along the face of the inclined surface of the body of water and cutting-back so as to return down and across the face of the body of water and the like, e. g., lip bashing, floaters, inverts, aerials, 360's, etc.

[0109] Water skimming manoeuvres can be performed with the human body or upon or with the aid of a riding or planing vehicle such as a surfboard, bodyboard, water ski (s), inflatable, mat, inner tube, kayak, jet-ski, sail boards and the like.

[0110] In order to perform water skimming manoeuvres, the forward force component required to maintain a rider and optionally a skimming device used, in a stable riding position and overcome fluid drag is due to the downslope component of the gravity force created by the constraint of the solid flow forming surface balanced primarily by momentum transfer from the high velocity upward shooting water flow upon said forming surface.

[0111] The upslope motion of the rider's consists of the rider's drag force relative to the upward shooting water flow exceeding the downslope component of gravity. Turns, cross-slope motion and oscillating between different elevations on the "wave" surface are examples of

non-equilibrium riding manoeuvres and are possible by the interaction between the respective forces as described above and the use of the rider's kinetic energy.

[0112] The invention will now be described by a detailed description of several embodiments of the invention. It is clear that other embodiments of the invention can be configured according to the knowledge of persons skilled in the art without departing from the true spirit or technical teaching of the invention, the invention being limited only by the terms of the appended claims.

[0113] A water ride attraction arrangement 100 according to the first, second and fifth aspect of the present invention is shown in Figure 1, Figure 2 and Figure 4. Figure 3 shows a detail of the ride volume with ride surface coupled to the frame. The water ride attraction arrangement is a mobile water ride attraction arrangement, and comprises a ride volume 120 providing a ride surface 121. The water ride attraction arrangement further comprises one nozzle 201 being part of at least one water guiding means 200 for providing the jet of water on the ride surface. The water is taken from a water volume 190. The ride volume 120 is suitable to float on the water volume 190, thereby aligning the ride surface 121 with the water surface 191.

[0114] The water ride attraction arrangement further comprises a frame 110 suitable for holding a water volume 190 having a water surface 191. The frame 110 is suitable for holding the ride volume 120.

[0115] The arrangement comprises an orientation adjustment unit for changing the orientation of the ride volume relative to the frame so as to aligning the ride volume. The orientation adjustment unit comprises at least one, and in this particular embodiment two floats 122 and 123, which are provided as part of the ride volume 120. When the floats are floating in the water volume 190 provided in the frame 110, the floats may cause the orientation of the ride volume to change relative to the frame. As such, the ride volume is aligned according to a predetermined position relative to the horizontal and vertical, more particular a predetermined position relative to the water surface of the water volume, which water surface is identical to the horizontal.

[0116] The ride volume 120 comprises at least one, and in this particular embodiment two floats, referred to as 122 and 123, for allowing the ride volume 120 floating on the water volume 190 for aligning the ride surface 121 with the water surface 191. In the embodiment shown, the floats are present at the lower side 124 of the ride volume. It is understood that the floats may be positioned differently, still performing its function of aligning the ride surface 121 with the water surface 191.

[0117] As an alternative, the ride volume itself may be floating on the water volume due to its particular shape and dimension.

[0118] The frame 110 in this embodiment is suitable to hold the water volume 190 and is provided with two frame elements 111 and 112, each having a substantially U-shaped profile. It is understood that the frames may

be provided with other frame elements, which elements are used to couple the ride volume 120 to the frame by means of these frame elements.

[0119] The attraction arrangement further comprises a ride volume locking means 130 able to change between locked and unlocked condition. The ride volume locking means comprises a first hinge 131 allowing rotation of the ride volume 120 relative to the frame 110 round an axis of rotation 133. The first hinge couples the frame 110 to the ride volume 120 at the frame element 111. A second hinge 132, coupling the frame 110 to the ride volume 120 at frame element 112, is provided. The hinge 132 allows the ride volume to rotate in respect to the frame around an axis of rotation, which axis coincides with the axis 133 of rotation of the first hinge 131. The axes of both hinges 131 and 132 are identical.

[0120] The ride volume locking means 130 in unlocked condition allows the ride volume to move relative to the frame due to the floating of the ride volume 120 on the water surface. In this embodiment, the ride volume 120 is allowed to move relative to the frame 110 due to the floating of the ride volume 120 on the water surface 191 by rotating about the common axis 133 of hinges 131 and 132. As the two floats 122 and 123 are positioned each at one side of the axis 133, the upward force acting upon both floats by the water volume will rotate the ride volume 120 being a stiff construction, around the axis 133 until an equilibrium is obtained between the forces of the water volume acting upon the floats and the gravity forces acting on the ride volume itself. As such, the ride volume aligns itself, by rotation about the axis 133 in respect to the water surface, with the water surface and thus with the vertical. The alignment is substantially independent of the position of the frame relative to the ground.

[0121] It is understood by the skilled man that the rotation about the axis 133 may be limited. Hence the alignment of the ride surface by means of the float or floats may be limited to a rotation about the axis of about -30° to $+30^\circ$, e.g. about -15° to $+15^\circ$, such as between -10° and $+10^\circ$.

[0122] As shown in Figure 1, the ride surface 121 of the water ride attraction arrangement 100 has a longitudinal direction 180, which direction 180 coincides with the flow of water intended to flow on the ride surface. It was found that a misalignment of the ride surface relative to the orientation around the longitudinal direction, hence around the axis 133, might cause the flow of water on the ride surface to be disturbed. The water tends to run too much to one of the two edges of the ride surface. This may cause the water flow at some parts of the ride surface to be no longer suitable to allow water-skimming manoeuvres to be performed thereon. This misalignment is at least partially avoided by the provision of floats which balance, thus orient, the ride surface relative to the axis 133.

[0123] In order to further align the ride volume, hence the ride surface to the water surface, the locking means

may be provided with means to adjust the inclination of the axis 133 in view of the water surface, i.e. to bring it substantially parallel to the water surface. This may be achieved e.g. by using hinges having more than one axis of rotation, such as ball-and-socket hinges.

[0124] The ride volume locking means may be switched from unlocked to locked condition, depending on the elements used to prevent the ride volume to move in reference to the frame. The ride volume locking means in locked condition locks the ride volume in a fixed relative position to the frame. The additional elements 150 to lock, i.e. to prevent the ride volume to move in reference to the frame may be hydraulic or a mechanical means, such as tightening screws and alike.

[0125] An example is given in Figure 8. A hydraulic locking means 800 comprises one or more pistons 810 being coupled to the lower surface of the ride volume at one side of the axis 133. The hydraulic locking means 800 comprises one or more pistons 820 being coupled to the lower surface of the ride volume at the opposite side of the axis 133. The pistons 810 and 820 are provided with a working fluid 830. The working fluid may pass from one of the pistons 810 to one of the pistons 820 via a tubing 840 and a valve 850, when the valve 850 is opened. So during the floating and aligning of the ride volume, the valve is opened and the height of the pistons is adjusted by the rotation of the ride volume, while the working fluid is set in equilibrium between the pistons 810 and 820. Once the ride volume is aligned with the water surface by floating on the water volume, the valve 850 is closed, thereby preventing the working fluid 830 to flow between the pistons 810 and 820. Hence the height of the pistons are fixed and the ride volume is prevented to rotate about axis 133 via the upward force acting upon the ride volume 120 by the locked pistons 810 and 820. The pistons preferably are on a substantially identical distance from the axis 133, and may be fixed to the frame, e.g. at frame elements 111 or 112.

[0126] In alternative embodiments, one or both the hinges 132 or 131 may be ball-and-socket hinges.

[0127] The water ride attraction arrangement further comprises at least one nozzle for emitting a jet of water to the ride surface. This nozzle, and optionally more than one nozzle, may be in a fixed position with regard to the ride surface. The aperture of the nozzles, via which a jet of water is emitted onto the ride surface, may be an aperture on the ride surface itself. The nozzle is so-to-say integrated onto the ride surface. The nozzle may be coupled to a water displacing means, such as a pump, via a water guiding means, e.g. a flexible duct. The other parts of the water guiding means, such as water pumping means, may be in a fixed position in the water ride attraction arrangement. As an example, the water pumping means may be located in a tubular pump housing, which is located under the ride volume on the bottom of the water ride attraction arrangement. The tubular outlet of the pump housing may be coupled to the nozzle via a flexible duct.

[0128] Alternatively, the water guiding means may have a stiff construction, including a water pumping means and a pump housing, which stiff water guiding means is in a fixed position with regard to the ride surface, e.g. in a tubular pump housing, which is located under the ride volume on the bottom of the water ride attraction arrangement or located aside the water ride volume. When the ride volume is in unlocked position, and aligns itself by rotation of the ride volume around the axis 133, the water guiding means rotates along with the ride volume as an integral part of it. The water pumping means and the pump housing may e.g. rotate along with the ride volume. This has the advantage the water ride volume and the water guiding means are always in a correct and predefined position.

[0129] Turning to a second aspect of the present invention, the water ride attraction arrangement 100 comprises one, but optionally more than one, nozzle 201 for emitting a jet of water to the ride surface 121. A detail is shown in Figure 7.

[0130] The nozzle 201 is part of at least one water guiding means 200 for providing the jet of water on the ride surface.

[0131] The water ride attraction arrangement 100 further comprises a suspension system 300 for rotatably coupling the water guiding means 200 onto the frame 110. The suspension system enables the water guiding means 200 to rotate relative to the frame 110 about a first axis 391 being substantially parallel with the water jet direction 390.

[0132] The rotation about the axis of the water guiding means caused by gravitational forces, brings the point of gravity of the water guiding means in the plane defined by the vertical, i.e. the gravity direction, and the axis of rotation 391. Preferably the axis 391 is parallel or even coinciding with the axis 133.

[0133] More particularly, the suspension system 300 for hanging the water guiding means 200 onto the frame 110, may be connected to the water guiding means 200 by means of one or more suspension points, such as two suspension points. As an example in Figure 7, the suspension system 300 is connected to the water guiding means 200 at one suspension point 301.

[0134] The water ride attraction arrangement 100 further comprises a water guide locking means 310 able to change between locked and unlocked condition. In locked condition, the water guide locking means locks the water guiding means in a fixed relative position to the frame. The water guide locking means in unlocked condition allows the water guiding means to move relative to the frame, at least allow rotation about axis 391.

[0135] In case the water guiding means is hung by means of one suspension point, the suspension system allows the suspension point 301 and the gravity point 203 of the water guiding means 200 to align under gravity force in direction of gravity, due to the hanging of the water guiding means on the frame by the suspension point, when the water guide locking means is in unlocked

condition.

[0136] The water guiding means has a nozzle with an aperture 202 for providing a jet of water onto the ride surface. The aperture is in a fixed relative position with the point of gravity 203 of the water guiding means. The aperture, e.g. a long rectangular-like opening having its long side substantially parallel to the ride surface, is oriented relative to the vertical by the hanging of the water guiding means by the suspension point in unlocked condition. Once the orientation of gravity point and suspension point has reached a stable condition, the water guide locking means is switched to locked condition. By doing this, the aperture obtains a fixed position with regard to the vertical, i.e. the gravity direction, hence with regard to any water surface, which is provided in the water ride attraction arrangement.

[0137] The suspension system can be a simple loop or eyelet and a hook which co-operate with each other. The eyelet or loop can be provided connected to the frame, the hook connected to the water guiding means, or vice versa, the hook being connected to the frame, the loop eyelet being connected to the water guiding means. In the alternative, hinges such as ball-and-shell hinges, hinges with two axes of rotation, or a flexible connection such as a polymer or metal cable can be used.

[0138] The suspension point may be provided to a profiled beam of the frame.

[0139] The water ride attraction arrangement having the above-mentioned features has the advantage that both the ride surface and the water guiding means including the aperture of the nozzle, can easily be aligned with the vertical, independent of the location where the water ride attraction arrangement, such as a mobile water ride attraction arrangement, is placed. By providing the water ride attraction arrangement on a slightly inclined ground surface, the main components of the attraction arrangement which are to make the flow of water as necessary to allow the rider to make skimming manoeuvres can be aligned to the vertical and to each other according to the intended orientation, without the need of any additional alignment means.

[0140] The alignment can be done by first providing the water ride attraction arrangement on a given ground surface, the attraction arrangement having the features as set out above.

[0141] The water guide locking means of the water guiding means is provided in unlocked condition allowing the suspension point and the gravity point to align under gravity force in direction of gravity.

[0142] The water guide locking means of the water guiding means is brought in locked condition, thereby locking the water guiding means in a fixed relative position to the frame. The line suspension point and gravity point of the water guiding means is now aligned along the vertical. The aperture of the nozzle is now also provided in an orientation correctly oriented to the direction of gravity, and thus the water surface of any water volume, which is to be provided in the attraction arrange-

ment.

[0143] Water, or any other suitable liquid, is provided into the frame, thereby providing a liquid volume having a liquid surface in the frame.

[0144] The ride volume locking means of the ride volume when it is provided in the unlocked condition allows the ride volume to move relative to the frame by floating of the ride volume on the water surface, thereby aligning the ride surface with the water surface. Once the alignment of the ride volume reaches a stable position, the ride volume locking means of the ride volume is brought into the locked condition, thereby locking the ride volume in a fixed relative position to the frame.

[0145] The suspension system further may comprise means to change the distance between water guiding means and frame in direction of gravity. By changing the distance, the position of the aperture of the nozzle and the ride surface in vertical direction may be set to a required value.

[0146] The ride surface, as a part of the ride volume is now aligned with the vertical, similar as the aperture of the nozzle of the water guiding means is aligned with the very same vertical. As a consequence, both the aperture and the ride surface are aligned one to the other.

[0147] The water ride attraction arrangement further may comprise other parts. The ride volume has a ride surface, which ride surface is provided by a tissue-like sheet. This sheet may be a mono- or multilayer sheet, optionally a mono- or multilayer polymer sheet. The sheet may be provided from polyvinylchloride (PVC), and is optionally a reinforced PVC sheet. The sheet may be provided more UV-resistant using suitable additives in the polymer, such as UV-stabilisers suitable for use in combination with PCV. An example of a suitable layer is a swimming pool liner type 35216 or 35217 of the company Alkor Plan. The sheet is coupled to the stiff construction of the ride volume by means of hook-and-loop tape strips 400, the one part of the strip coupled to the ride volume, the other part being provided at one side of the sheet.

[0148] The ride surface may be provided with any suitable shape. In the present embodiment, the ride surface has a curved shape, and has upstanding plates 401 along its side in length direction 180. Along the sides, some openings 402 are present in the plates to allow water to escape from the ride surface to the adjacent water volume. These openings prevent water waves to be created, disturbing the flow of water on the ride surface. The openings are provided preferably at the deepest point of the ride surface curvature. The curvature of the ride surface in direction and orientation of the flow of water as shown in figures 1 to 6, has a downwards-oriented section 410, a substantially horizontal section 411 and an upwards inclined section 412. The hook-and-loop strips preferably comprise an interruption at the deepest point of the ride surface curvature, i.e. the substantially horizontal section 411. This to allow water that entered between the ride volume and the sheet, to escape in widthwise direction

181.

[0149] It is understood that the ride surface may comprise other sections to create circumstances or performing any type of ride manoeuvre on the ride surface. The ride volume may be provide as segments which can be interchanged to adapt the type and profile of the ride surface.

[0150] The nozzle or nozzles of the water guiding means may be provided with one or more flow reduction devices or throttling devices such as valves 380. These flow reduction devices or throttling devices are to adjust the jet of water hence the water flow on the ride surface. Several valves 380 may be mounted adjacent to each other along the plane of the aperture 202 of the nozzle 201.

[0151] A third aspect of the present invention is shown in Figure 4, Figure 5 and Figure 6. The frame of the mobile water ride attraction arrangement 100 comprises a base section 500.

[0152] The base section comprises a substantially rectangular planar centre area 510 having a first longitudinal side 511 and a second longitudinal side 512 in longitudinal direction 180 and a first widthwise side 513 and a second widthwise side 514 in widthwise direction 181.

[0153] An upright direction 182 is defined by the centre area, defined by being perpendicular to both widthwise direction 181 and longitudinal direction 180.

[0154] The frame 110 further comprises a first planar side extension area 520 being coupled to the centre area 510 along the first longitudinal side 511. The first planar side extension area is able to rotate along the first longitudinal side to bring the first planar side extension area angled or even parallel to the upright direction. This rotation is done by rotating the areas along a hinge having an axis 521 along the first longitudinal side 511. Alternatively, the first planar side extension area may slide under or over the base section, but is prevented to be separated from the base section.

[0155] A second planar side extension area 530 is coupled to the centre area 510 along the second longitudinal side 512, the second planar side extension area 530 being able to rotate along the second longitudinal side 512 to bring the second planar side extension area 530 angled or even parallel to the upright direction 182. This rotation is done by rotating the areas along a hinge having an axis 531 along the second longitudinal side 512. Alternatively, the second planar side extension area may slide under or over the base section, but is prevented to be separated from the base section.

[0156] A third planar side extension area 540 being coupled to the centre area 510 along the second widthwise side 514. This third planar side extension area 540 is able to move relative to, such as rotate along the second widthwise side 514 to bring the third planar side extension area 540 parallel to the upright direction 182. In case the third planar side extension area 540 is rotatably mounted, this rotation is done by rotating the areas along a hinge having an axis 541 along the second longitudinal

side 514. The third planar side extension area 540 can be rotated in order to bring the third planar side extension area 540 angled to or even parallel with the base section.

[0157] A planar endplate 505 is coupled to the first widthwise side 513 along the first widthwise side and being parallel to the upright direction 182.

[0158] In case the first planar side extension area, second planar side extension area, third planar side extension area are rotatable with regard to the base section, when the first planar side extension area, second planar side extension area, third planar side extension area are placed in upright direction, these extension areas together with the planar end plate and centre area are to define a container. In this container all elements of the ride volume of the water ride attraction arrangement are positioned and can be transported.

[0159] The first planar side extension area 520, second planar side extension area 530 and the third planar side extension area 540 have substantially rectangular shapes, the sides 501 of the rectangular shapes perpendicular to the sides of the rectangular shapes coupled to the centre area have substantially identical lengths. The side of the endplate 505 is preferably rectangular. The rectangular shape perpendicular to the first widthwise side of the centre area has a length substantially identical to the length of the sides 501 of the rectangular shapes of the third side extension area perpendicular to the sides of the rectangular shapes coupled to the centre area. This has the advantage that, when all extension areas brought in upright position, a substantially cubical container is provided.

[0160] The first planar side extension area 520 is provided with a first substantially rectangular plate member 522 coupled along the side of the rectangular shape in longitudinal direction, which side is not coupled to the centre area. The first planar side extension area 520 and the first plate member 522 are positioned under an angle for providing the planar centre area and the first plate member oriented substantially perpendicular. As in this particular embodiment, the planar centre area and the first planar side extension area 520 can be provided in a substantially coplanar orientation, the first planar side extension area 520 and the first plate member 522 are positioned under a substantially square angle.

[0161] The second planar side extension area 530 is provided with a second substantially rectangular plate member 532 coupled along the side of the rectangular shape in longitudinal direction, which side is not coupled to the centre area. The second planar side extension area 530 and the second plate member 532 are positioned under an angle for providing the planar centre area and the second plate member oriented substantially perpendicular. As in this particular embodiment, the planar centre area and the second planar side extension area 530 can be provided in a substantially coplanar orientation, the second planar side extension area 530 and the second plate member 532 are positioned under a substantially square angle.

[0162] The sides 523 and 524 of the substantially rectangular first plate member 522, which sides are in this particular embodiment perpendicular to the first planar side extension area 520 have a first length. The sides 533 and 534 of the substantially rectangular second plate member 532, which sides are in this particular embodiment perpendicular to the second planar side extension area 520 have a second length. The sum of the first length and the second length is substantially equal to the dimension of the centre area in widthwise direction. As such, the first and second plate members form a roof of the container when all extension areas are brought in upright position, defining a substantially cubical container. Preferably the first and second lengths are identical.

[0163] The ride volume having a ride surface is provided within the frame of the mobile water ride attraction arrangement. The ride surface has a lowest point and a highest point. The lowest point is the point of the ride surface on the smallest distance to the planar centre area in vertical direction. The highest point is the point of the ride surface on the largest distance to the planar centre area in vertical direction. When the container is opened and the extension areas are positioned planar or angled relative to the base section, all rectangular plate members together with the end plate delimit a basin in which the water volume of the ride attraction arrangement can be provided. The upper edge of the basin i.e. the edge encompassing the ride surface and being defined by all rectangular plate members together with the end plate above the base section, is positioned at a smaller distance than the upper point of the ride surface. Preferably the edge encompassing the ride surface is positioned at a height between the lowest and highest point of the ride surface. Between the edge encompassing the ride surface and the ride surface itself, appropriate safety means may be provided to prevent the rider to fall into the water volume. Such safety means may be safety nets or similar means.

[0164] The attraction arrangement further may comprise a machine room 600 having a substantially cubic volume, the planar endplate constituting one of the sides of the cubic volume. The machine room has a height preferably identical to the dimensions of the end plate in widthwise and upward dimensions.

[0165] Together with of the container defined by all extension areas brought in upright position, this machine room and container for one integral construction that can be transported by train, boat, lorry, and the like. It is understood that preferably the dimensions are chosen as such that the volume of the machine room and container match normal dimensions of containers.

[0166] Optionally, the third planar side extension area 540 is provided with a third substantially rectangular plate member 542 coupled along the side of the rectangular shape in longitudinal direction, which side is not coupled to the centre area. The third planar side extension area 540 and the third plate member 542 are positioned under a substantially square angle.

[0167] The side 543 of the substantially rectangular third plate member 542, which side is perpendicular to the third planar side extension area 540 has a length preferably identical to the length of the sides 523, 524, 533 and 534.

[0168] Optionally a fourth and fifth substantially rectangular plate member 550 and 560 are provided. The fourth substantially rectangular plate member 550 is coupled to the first substantially rectangular plate member 522 along side 524, allowing to couple this side 524 with one of the sides of the third substantially rectangular plate member 542. This coupling may be provided as a hinging coupling, allowing rotation about axis 551. Similarly, the fifth substantially rectangular plate member 560 is coupled to the second substantially rectangular plate member 532 along one of the sides 534, allowing to couple this side 534 with the other of the sides of the third substantially rectangular plate member 542. This coupling may be provided as a hinging coupling, allowing rotation about axis 561. The coupling of the fourth and fifth substantially rectangular plate members and the third substantially rectangular plate member 542 can be done by e.g. bolts and nuts or a clips system. The height of the fourth and fifth substantially rectangular plate members preferably matches the length of the side 524 respectively 534.

[0169] Optionally a sixth and seventh substantially rectangular plate member 570 and 580 are provided. The sixth substantially rectangular plate member 570 is coupled to the first substantially rectangular plate member 522 along the side 523, allowing to couple this side 523 with one of the sides of the end plate 505. This coupling may be provided as a hinging coupling, but it is preferably a fixed coupling of the sixth substantially rectangular plate member 570 with both the side 523 of first substantially rectangular plate member 522 and the widthwise side of the first planar side extension area 520.

[0170] Using a fixed coupling of the sixth substantially rectangular plate member 570 with both the side 523 of the second substantially rectangular plate member 522 and the widthwise side of the second planar side extension area 520, when extension area 520 is brought in upright position, plate member 570 is to pass before the end plate 505, i.e. before the surface of end plate 505 oriented towards the ride surface.

[0171] Similarly, the seventh substantially rectangular plate member 580 is coupled to the second substantially rectangular plate member 532 along the side 533, allowing to couple this side 533 with the other one of the sides of the end plate 505. This coupling may be provided as a hinging coupling, but it is preferably a fixed coupling of the seventh substantially rectangular plate member 580 with both the side 533 of second substantially rectangular plate member 532 and the widthwise side of the second planar side extension area 530.

[0172] Using a fixed coupling of the seventh substantially rectangular plate member 580 with both the side 533 of the second substantially rectangular plate member

532 and the widthwise side of the second planar side extension area 530, when extension area 530 is brought in upright position, plate member 580 is to pass before the end plate 505, i.e. before the surface of end plate 505 oriented towards the ride surface.

[0173] The height of the sixth and seventh substantially rectangular plate members preferably matches the length of the side 523 respectively 533

[0174] The dimensions may such be chosen to allow, when the extension areas are brought in upright position, to slide the sixth and seventh substantially rectangular plate member before the end plate 505 in longitudinal direction.

[0175] When the container is opened and the extension areas are positioned planar or angled relative to the base section, all rectangular plate members together with the end plate delimit a basin in which the water volume of the ride attraction arrangement can be provided. Optionally additional flooring elements 591 and 592 are provided. In order to make the basin liquid tight, the inner side of the basin is lined with a water resistant lining, preferably a water resistant and liquid tight sheet of fabric, such as a textile fabric or a polymer coated textile fabric.

[0176] The mobile water ride attraction arrangement further is provided with a means for aligning the ride surface with the water surface of the water volume, being preferably a means for moving the ride volume relative to the frame for aligning the ride surface with the water surface of the water volume, as set out with regard to the first aspect of the present invention above.

[0177] The nozzle of the water guiding means ends in an aperture which aperture extends through a slightly larger hole in the end plate 505. The ride surface is positioned with in the basin. The nozzle and its aperture is positioned in the machine room 600. As set out above, the alignment can easily be provided by the provision of the features according to the first and/or the second aspect of the present invention.

[0178] It is understood that other features such as safety means to prevent rides to fall in the water volume or to be sucked to the water pumping means may be provided.

[0179] The alignment of the ride surface according to any of the aspects of the present invention, can be done manually, in a semi-automated manner or in an automated manner. Manual operation means that the actions necessary to perform the alignment are done by intervention of an operator. Automated is to be understood as activated and controlled by appropriate control means without the necessity to intervention of an operator. Semi-automated is to be understood as including actions done by intervention of an operator, and other actions being activated and controlled by appropriate control means without the necessity to intervention of an operator.

[0180] Other arrangements for accomplishing the objectives of the water ride attraction arrangements and methods to align parts of water ride attraction arrangements embodying the invention will be obvious for those

skilled in the art.

[0181] It is to be understood that although preferred embodiments, specific constructions and configurations, as well as materials, have been discussed herein for devices according to the present invention, various changes or modifications in form and detail may be made without departing from the scope and spirit of this invention. For example, any formulas given above are merely representative of procedures that may be used. Functionality may be added or deleted from the block diagrams and operations may be interchanged among functional blocks. Steps may be added or deleted to methods described within the scope of the present invention.

Claims

1. A water ride attraction arrangement comprising

- a ride volume providing a ride surface, and
- a water guiding means for providing a jet of water to the ride surface, the water being taken from a water volume, the ride volume being suitable for floating on the water volume and for aligning the ride surface with the water surface of the water volume.

2. A water ride attraction arrangement according to claim 1, wherein the ride volume has an upper side providing the ride surface and a lower side opposite to the upper side, the ride volume comprising at least one float being present at the lower side of the ride volume.

3. A water ride attraction arrangement according to any one of the claims 1 or 2, wherein the water ride attraction arrangement further comprises a frame suitable for holding a water volume having a water surface.

4. A water ride attraction arrangement according to claim 3, wherein the arrangement further comprising a ride volume locking means able to change between locked and unlocked conditions, the ride volume locking means in locked condition locking the ride volume in a fixed relative position to the frame, the ride volume locking means in unlocked condition allowing the ride volume to move relative to the frame due to the floating of the ride volume on the water surface.

5. A water ride attraction arrangement according to claim 4, wherein the ride volume locking means comprises at least a first hinge, the frame and the ride volume being coupled to each other by said first hinge when the ride volume locking means is in unlocked condition, the first hinge allowing rotation of the frame and ride volume round a first axis of rota-

tion.

6. A water ride attraction arrangement according to any one of the claims 1 to 5, the attraction arrangement further comprising:

- a frame suitable for holding a ride volume;
- at least one water guiding means for providing a jet of water having a water jet direction to the ride surface,
- the arrangement further comprising a suspension system for rotatably coupling the water guiding means onto the frame, the suspension system enables the water guiding means to rotate relative to the frame about a first axis being substantially parallel with the water jet direction.

7. A water ride attraction arrangement comprising:

- a ride volume providing a ride surface;
- a frame suitable for holding the ride volume;
- at least one water guiding means for providing a jet of water having a water jet direction to the ride surface,
- the arrangement further comprising a suspension system for rotatably coupling the water guiding means onto the frame, the suspension system enables the water guiding means to rotate relative to the frame about a first axis being substantially parallel with the water jet direction.

8. A water ride attraction arrangement according to any one of the claims 6 to 7, wherein the suspension system has one suspension point, the suspension system allows the suspension point and the gravity point to align under gravity force in direction of gravity,

9. A water ride attraction arrangement according to any one of the claims 6 to 8, wherein the arrangement further comprising a water guide locking means able to change between locked and unlocked condition, the water guide locking means in locked condition locking the water guiding means in a fixed relative position to the frame, the water guide locking means in unlocked condition allowing the water guiding means to move relative to the frame due to the hanging of the water guiding means on the frame by said suspension system.

10. A water ride attraction arrangement according to any one of the claims 6 to 9, wherein the suspension system further comprises means to change the distance between water guiding means and frame in direction of gravity.

11. A water ride attraction arrangement according to any one of the claims 1 to 10, wherein the water ride

attraction arrangement is a mobile water ride attraction arrangement.

12. A mobile water ride attraction arrangement comprising a ride volume providing a ride surface, a frame holding the ride volume and being suitable to hold a water volume, the arrangement further comprising a water guiding means for providing a jet of water to the ride surface, wherein the arrangement further comprises an orientation adjustment unit for changing the orientation of the ride volume relative to the frame so as to aligning the ride volume.

13. A mobile water ride attraction arrangement according to claim 12, wherein the arrangement further comprises a ride volume locking means able to change between locked and unlocked conditions, the ride volume locking means in locked condition locking the ride volume in a fixed relative position to the frame, the ride volume locking means in unlocked condition allowing the ride volume to move relative to the frame.

14. A mobile water ride attraction arrangement, wherein the arrangement comprises a ride volume providing a ride surface, a frame to hold the water volume and a water guiding means for providing a jet of water to the ride surface, said frame comprising a base section, the planar centre area comprising a substantially rectangular planar centre area having a first longitudinal side and a second longitudinal side in longitudinal direction and a first widthwise side and a second widthwise side in widthwise direction, the centre area defining an upright direction being perpendicular to both widthwise direction and longitudinal direction, the frame comprising

- a first planar side extension area being coupled to the centre area along the first longitudinal side, the first planar side extension area being moveably connected to the planar centre area along the first longitudinal side
- a second planar side extension area being coupled to the centre area along the second longitudinal side, the second planar side extension area being moveably connected to the planar centre area along the second longitudinal side .

15. A mobile water ride attraction arrangement according to claim 14, wherein the first planar side extension area is rotatable along the longitudinal side, the second planar side extension area is rotatable along the second longitudinal side.

16. A mobile water ride attraction arrangement according to any one of the claims 11 to 15, wherein the water ride attraction arrangement is mounted on a trailer.

17. A mobile water ride attraction arrangement according to any one of the claims 11 to 15, wherein the water ride attraction arrangement is suitable to be displaced by means of a trailer.

18. A mobile water ride attraction arrangement according to any one of the claims 11 to 17, the arrangement comprising a means for aligning the ride surface with the water surface of the water volume.

19. A method for aligning a ride surface of a mobile water ride attraction arrangement, the mobile water ride attraction arrangement comprising a ride volume providing a ride surface, a frame holding the ride volume and being suitable to hold a water volume, the arrangement further comprising a water guiding means for providing a jet of water to the ride surface, wherein the method comprises the steps of

- mounting the frame of the arrangement onto a supporting surface, and
- aligning the ride volume by changing the orientation of the ride volume relative to the frame.

20. A method for aligning a ride surface of a water ride attraction arrangement, the water ride attraction arrangement comprising

- o a ride volume providing a ride surface, a water guiding means for providing a jet of water to the ride surface, the water being taken from a water volume, the ride volume being suitable for floating on the water volume and for aligning the ride surface with the water surface of the water volume;

the method comprising the steps of:

- providing a water volume having a water surface;
- aligning the ride surface with the water surface of the water volume by allowing the ride volume to float on the water volume.

Amended claims in accordance with Rule 137(2) EPC.

1. A water ride attraction arrangement (100) comprising:

- a ride volume (120) providing a ride surface (121);
- a frame (110) suitable for holding the ride volume (120);
- at least one water guiding means (200) for providing a jet of water having a water jet direction (390) to the ride surface (121),

characterised in that the arrangement (100) further comprises a suspension system (300) for rotatably coupling the water guiding means (200) onto the frame (100), the suspension system (300) enabling the water guiding means (200) to rotate relative to the frame (110) about a first axis being substantially parallel with the water jet direction (390).

2. A water ride attraction arrangement (100) according to claim 1, wherein the suspension system (300) has one suspension point (301), the suspension system allowing the suspension point (301) and a gravity point (203) of the water guiding means (200) to align under gravity force in direction of gravity.

3. A water ride attraction arrangement (100) according to any of the previous claims, wherein the arrangement (100) further comprises a water guide locking means (310) able to change between locked and unlocked condition, the water guide locking means (310) in locked condition locking the water guiding means (200) in a fixed relative position to the frame (110), the water guide locking means (310) in unlocked condition allowing the water guiding means (200) to move relative to the frame (110) due to the hanging of the water guiding means (200) on the frame (110) by said suspension system (300).

4. A water ride attraction arrangement (100) according to any of the previous claims, wherein the suspension system (300) further comprises means to change the distance between water guiding means (200) and frame (110) in direction of gravity.

5. A water ride attraction arrangement (100) according to any of the previous claims, wherein the arrangement (100) further comprises an orientation adjustment unit for changing the orientation of the ride volume (120) relative to the frame (110) so as to align the ride volume (120).

6. A water ride attraction arrangement (100) according to claim 5, wherein the arrangement (100) further comprises a ride volume locking means (130) able to change between locked and unlocked conditions, the ride volume locking means (130) in locked condition locking the ride volume (120) in a fixed relative position to the frame (110), the ride volume locking means (130) in unlocked condition allowing the ride volume (120) to move relative to the frame (110).

7. A water ride attraction arrangement (100), wherein the arrangement (100) comprises a ride volume (120) providing a ride surface (121), a frame (110) to hold a water volume (190), the ride volume (120) and a water guiding means (200) for providing a jet of water to the ride surface (121), said frame (110) comprising a base section (500), the base section

(500) comprising a substantially rectangular planar centre area (510) having a first longitudinal side (511) and a second longitudinal side (512) in longitudinal direction and a first widthwise side (513) and a second widthwise side (514) in widthwise direction, the frame (110) comprising

- a first planar side extension area (520) being coupled to the centre area (510) along the first longitudinal side (511), the first planar side extension area (520) being moveably connected to the planar centre area (510) along the first longitudinal side (511).

- a second planar side extension area (530) being coupled to the centre area (510) along the second longitudinal side (512), the second planar side extension area (530) being moveably connected to the planar centre area (510) along the second longitudinal side (512).

8. A water ride attraction arrangement (100) according to claim 7, wherein the first planar side extension area (520) is rotatable along the first longitudinal side (511), and the second planar side extension area (530) is rotatable along the second longitudinal side (512).

9. A water ride attraction arrangement (100) according to any of the previous claims, the arrangement (100) comprising a means for aligning the ride surface (121) with the water surface (191) of the water volume (190).

10. A water ride attraction arrangement (100) according to any of the previous claims, wherein the water guiding means is in a fixed position with regard to the ride surface.

11. A water ride attraction arrangement (100) according to any of the previous claims, wherein the water ride attraction arrangement (100) is a mobile water ride attraction arrangement.

12. A water ride attraction arrangement (100) according to any of the previous claims, wherein the water ride attraction arrangement (100) is mountable on a trailer.

13. A mobile water ride attraction arrangement (100) according to any of the previous claims, wherein the water ride attraction arrangement (100) is suitable to be displaced by means of a trailer.

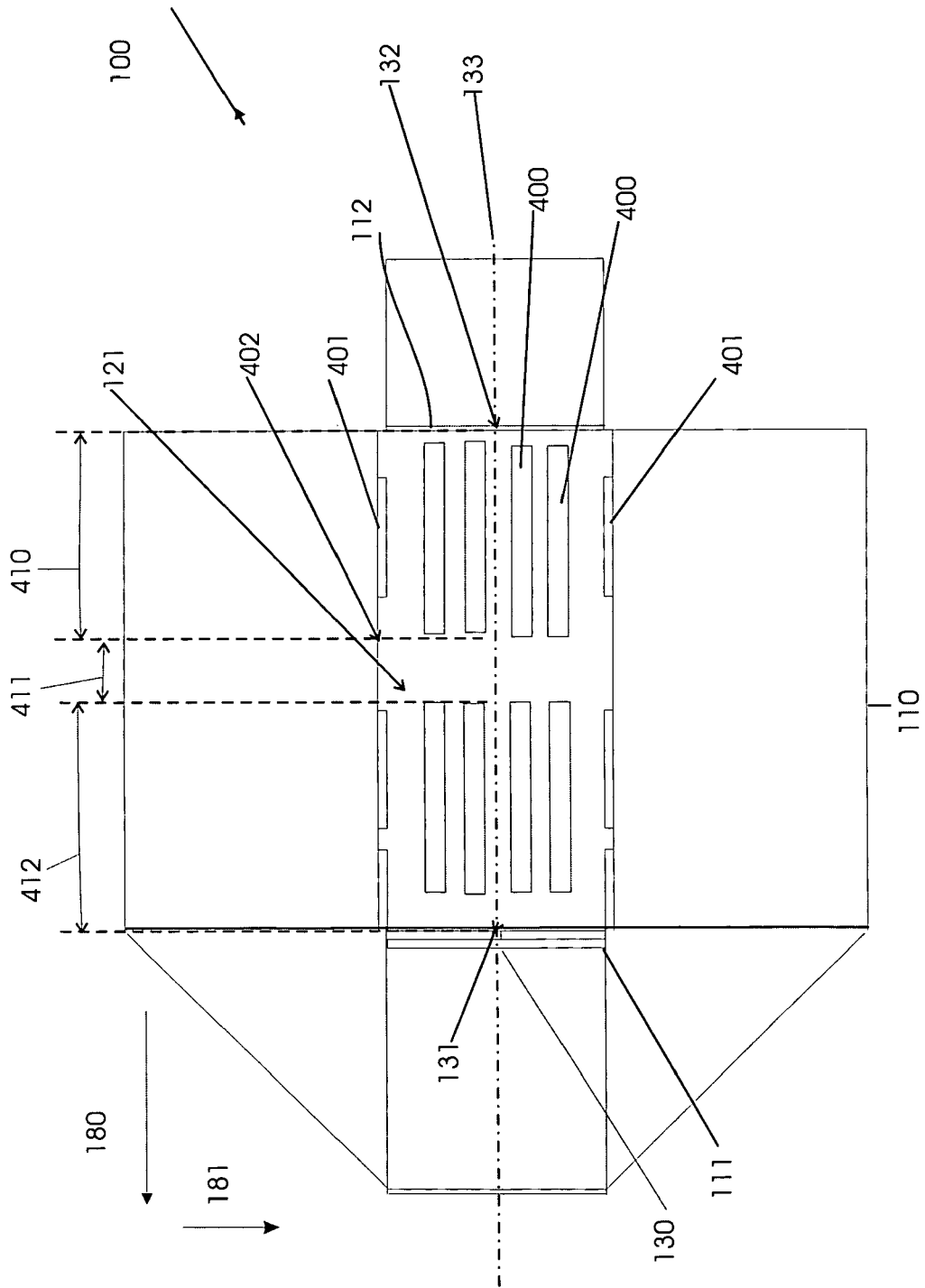
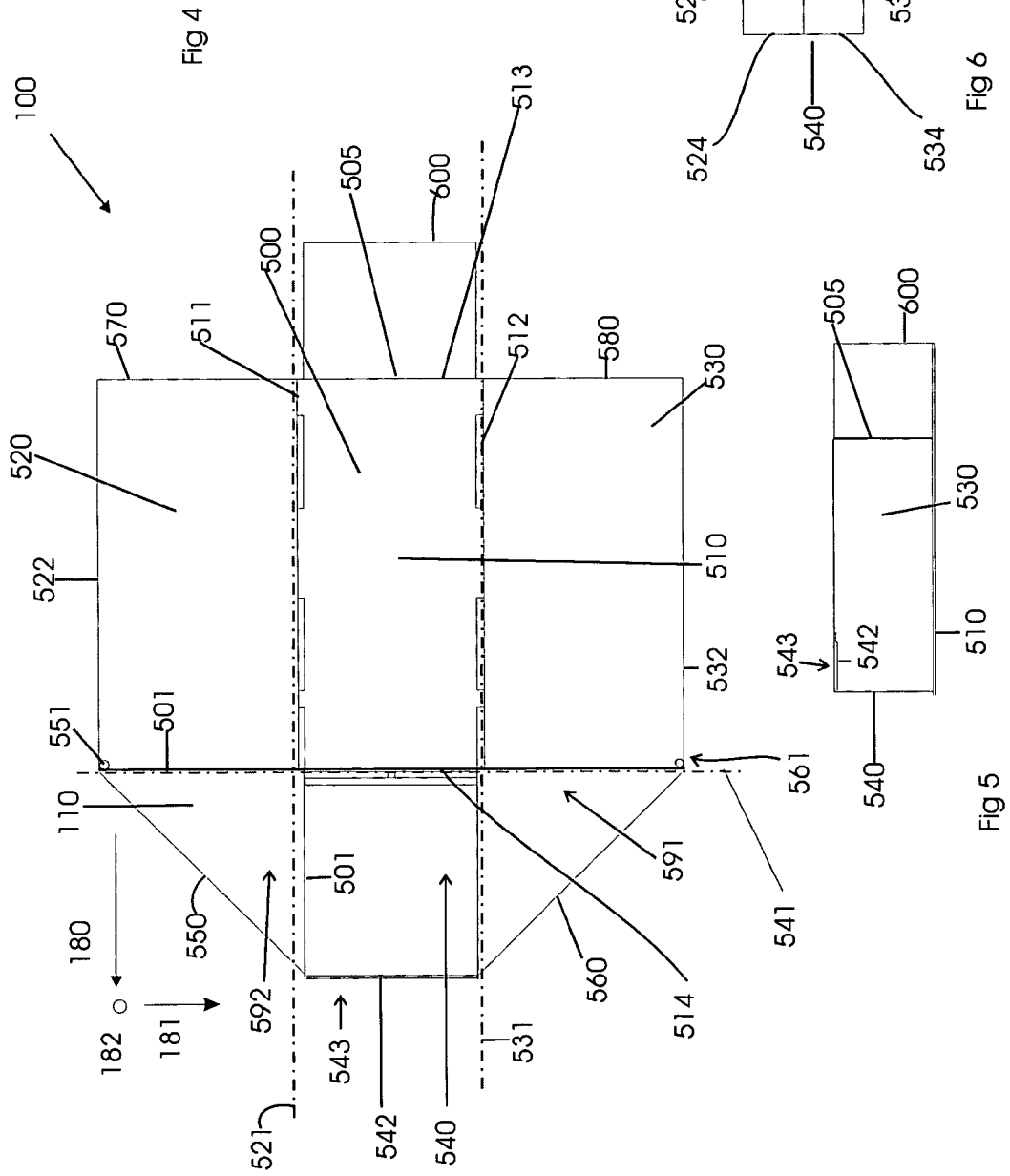


Fig 2



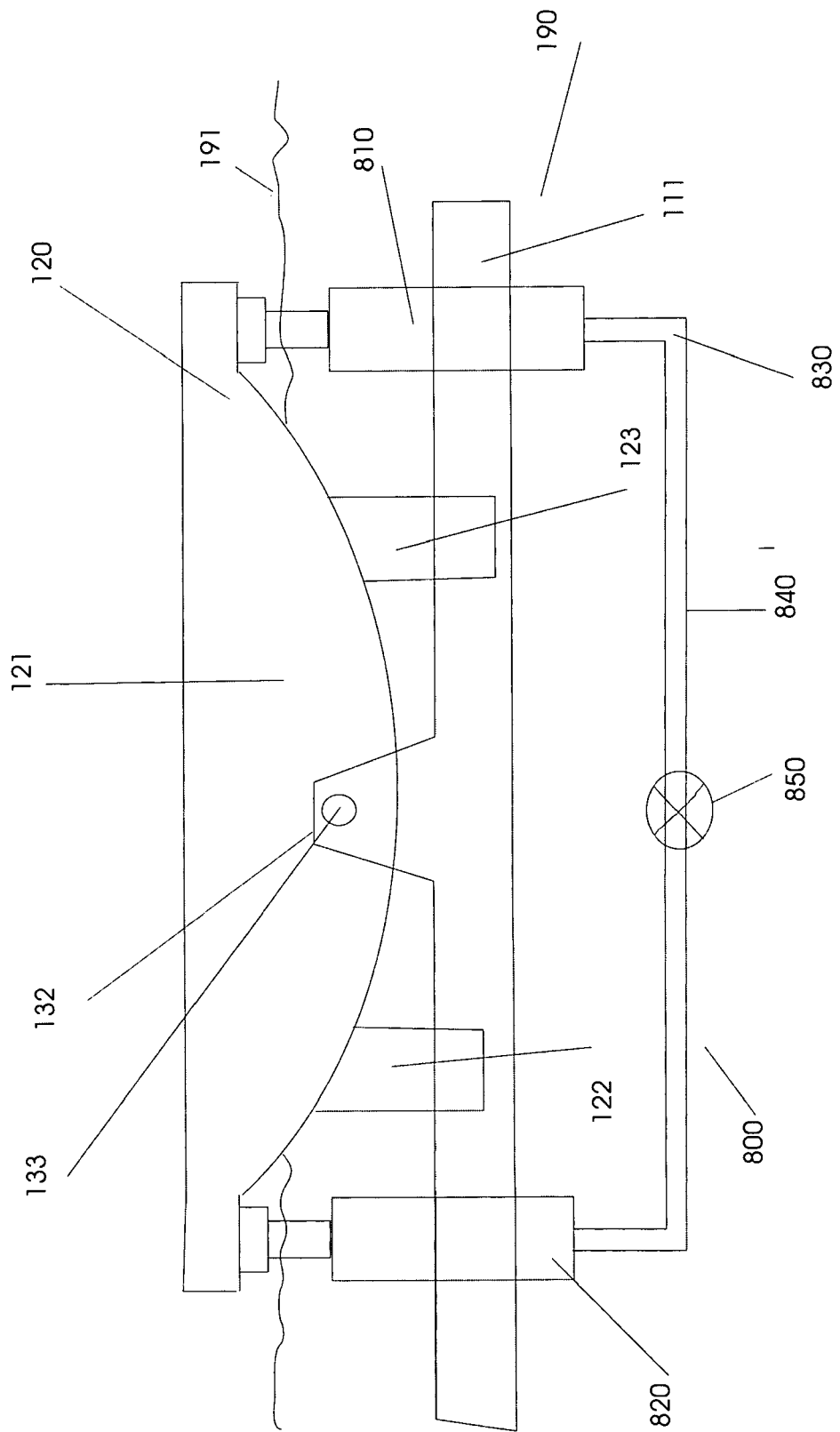


Fig 8



DOCUMENTS CONSIDERED TO BE RELEVANT			
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A	US 2003/198515 A1 (MCFARLAND BRUCE C [US]) 23 October 2003 (2003-10-23) * claim 18; figures 5,17 *	14-18	
A	US 6 019 547 A (HILL KENNETH D [US]) 1 February 2000 (2000-02-01) * figure 8c *	7	
			TECHNICAL FIELDS SEARCHED (IPC)
			E04H
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 5 February 2008	Examiner Rosborough, John
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**CLAIMS INCURRING FEES**

The present European patent application comprised at the time of filing more than ten claims.

- Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:
- The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-6,20

A water ride attraction and its method of use, whereby the ride volume is suitable for floating and can be thus aligned.

2. claims: 7-11

A water ride attraction whose water guiding means are rotatably coupled to the frame.

3. claims: 12,13,19

A mobile water ride attraction whose ride volume orientation relative to the frame can be adjusted.

4. claims: 14-18

A mobile water ride attraction having first and second planar side extensions which are movably connected to a planar centre area.

ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 07 00 8765

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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05-02-2008

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REFERENCES CITED IN THE DESCRIPTION

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