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(54) **Amusement and leisure slide**

(57) The present invention relates to an amusement and leisure slide configured to explore new thrill possibilities thanks to a long sliding path with a constantly variable slope and a controlled sliding duration. The slide comprises at least one sliding tube (2) forming a three-dimensional curve attached with fastenings (3) to a frame structure (1) having at least one outline frame (1a, 1b) of a predefined shape and a central rotation axis (4) arranged substantially horizontally. The sliding tube includes a first end forming an inlet (7) arranged in vicinity of the central rotation axis (4) of the frame structure (1) and a second end, distinct from the first end, forming an outlet (9) directed to outside the frame structure (1). The curve of the sliding tube (2) is configured to form a sliding path between the inlet (7) and the outlet (9) extending in a volume around the central rotation axis (4) of the frame structure (1), said sliding path being maintained on a variable slope by a rotation of the frame structure about the central rotation axis (4), said rotation being driven by a motor (14).

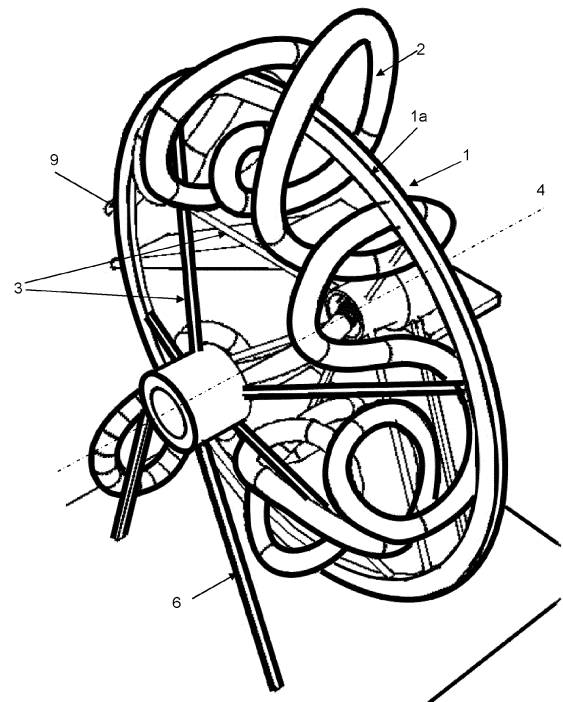


Fig. 1

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Description

Field of the invention

[0001] The present invention relates to an amusement and leisure slide for attraction parks, hotels, business or shopping centers with various combinations of thrilling experiences. In particular the slide comprises one or several toboggan curved tubes in which a rider slides on a variable slope in a wet or dry environment.

Technical background

[0002] Some conventional slides comprise static curved tubes and take a significantly large space and height to provide a sufficiently long path having a constant or variable downward slope.

[0003] For example, document W02010040978A1 disclose a waterslide apparatus comprising a bowl having a curved sidewall; and two or more rider entrances for enabling riders to slide into the bowl and to circuit at least a portion of the bowl. The waterslide apparatus allows two or more riders to circuit at least a portion of the bowl at the same time. The rider entrances may be provided at different heights in the sidewall of the bowl. A chute or flume is preferably associated with each rider entrance. In use, the riders travel down the chute or flume and enter the bowl with sufficient momentum to travel at least part-way around the bowl. The chutes each have an inlet through which a rider enters and an outlet which mates with the rider entrance. The chutes each have a longitudinal axis which proximal the inlet is inclined at an angle of less than or equal to 30° measured relative to the vertical.

[0004] Document W02009141588A2 discloses a system for conveying an individual in a leisure park, the system comprises a tube having an inlet and an outlet; and a rotatable screw for conveying the individual from said inlet to said outlet. The system further comprises an inlet flow control means adapted operatively to cause a surge of water into said inlet suitable for biasing an individual into the tube; and/or an outlet flow control means adapted operatively to cause a surge of water out of said outlet for biasing an individual out of the tube. The surge of water may correspond to an increased flow rate of the water as it enters the inlet and/or exits the outlet. Preferably, the surge of water is sufficient to transport the individual into the inlet and/or out of the outlet respectively. A surge of water into the inlet may ensure that an individual is introduced fully into the tube and is preferably clear of the inlet as the screw rotates. Likewise, a surge of water out of the outlet may ensure that an individual is expelled from the tube and is clear of the outlet as the screw rotates.

[0005] A backyard water slide simulator is shown on web site of Grand Idea Studio <http://www.grandideastudio.com/portfolio/pt-waterslide-simulator>. This simulator comprises a semi-circular tube forming a wheel rotating

about its rotation axis and rocking in several directions. A rider slides in the tube supplied with water thanks to the rotation of the wheel driven by a motor and to its simultaneous rocking carried out by hydraulic or pneumatic jacks.

Summary of the invention

[0006] An aim of the invention is to provide a slide configured to explore new thrill possibilities thanks to a long sliding path with a constantly variable slope and a controlled sliding duration.

[0007] The aim is achieved by an amusement and leisure slide comprising at least one sliding tube forming a three-dimensional curve attached with fastenings to a frame structure having at least one outline frame of a predefined shape and a central rotation axis arranged substantially horizontally **characterized in that:**

- the sliding tube includes a first end forming an inlet arranged in vicinity of the central rotation axis of the frame structure and a second end, distinct from the first end, forming an outlet directed to outside the frame structure;
- the curve of the sliding tube is configured to form a sliding path between the inlet and the outlet extending in a volume around the central rotation axis of the frame structure, said sliding path being maintained on a variable slope by a rotation of the frame structure about the central rotation axis, said rotation being driven by a motor.

[0008] Riding is almost infinite since gravity height loss is compensated by the rotational energy provided by the frame structure. As a rider slides in the tube between the inlet and the outlet and dissipates energy by friction, the average potential energy is maintained thanks to the rotation of the frame structure.

[0009] The rider enters the tube by the inlet placed in a central area of the frame structure preferably during rotation of the frame structure for providing a more intense thrill level than entering a static one.

[0010] The rider exits the tube by the outlet when rotation stops after a given time. In some cases, the rotation can also be maintained or slowed down while the rider exits the tube in particular in a pool of an aquatic slide.

[0011] An advantage of the slide according to the invention is that the overall dimensions are significantly reduced in relation to the ones of conventional slides which are relatively cumbersome for similar performances regarding especially sliding speed, sliding path length and sliding duration.

Brief description of the figures

[0012] The invention will be better understood with the following detailed description, which refers to the at-

tached figures given as non-limitative examples.

Figure 1 shows an embodiment of the slide of the invention with a circular frame structure with one outline frame mounted on a support and rotating like a wheel about a horizontal central axis arranged on the support

Figure 2 shows an embodiment of the slide of the invention with a circular frame structure with two opposite outline frames mounted on a support and rotating like a wheel about a horizontal central axis arranged on the support.

Figure 3 shows an embodiment where the circular frame structure is mounted on external rollers driving the rotation about the horizontal central axis.

Figure 4 shows an embodiment with a curved sides star shaped frame structure where the sliding tube inlet is arranged on ground level.

Figure 5 shows a portion of a half circular sliding tube situated in the vicinity of the inlet at the center of the frame structure.

Figure 6 shows a bifurcator with one entry directing to inlets of several sliding tubes

Figure 7 shows a bifurcator with two opposite entries directing to inlets of several sliding tubes.

Detailed description of the invention

[0013] The slide according to the invention is provided with a frame structure (1) holding one or a plurality of sliding tubes (2) with fastenings (3) distributed along the outline frame (1a) of the frame structure (1). The embodiment of figure 1 includes one circular outline frame (1a) supporting one sliding tube (2) forming circumvolutions turning in a volume around the central axis (4) of the circular outline frame (1a). The outline frame (1 a) may have various shapes other than a circle, such as a star or a polygon with rectilinear or curved sides etc. depending on esthetic criteria set by the slide environment

[0014] According to an embodiment illustrated by figure 2, the frame structure (1) includes two opposite outline frames (1 a, 1 b) attached together with spacers (1c). As in the example of figure 1, the shape of the outline frames (1 a, 1 b) may be different from a circle. Furthermore they may be each of different shapes or shifted each other or arranged in quincunx particularly in case of star or polygonal shapes. The sliding tube(s) (2) forming a more or less complex three-dimensional curve attached with the fastenings (3) is arranged around the central axis (4) of the frame structure (1) and extends in a volume defined between the two opposite outline frames (1 a, 1 b) and also outside by portions in the vicinity

of this volume. The examples of figures 2 and 3 show some tubes configurations where turns of the curve go out the frame structure (1). Portions of the curve may project beyond the frame structure (1) out of one or both sides of the outline frame (1 a, 1 b) as portions 2B and/or out of the edges of the outline frames (1 a, 1 b) as portions 2A.

[0015] In both examples of figure 1 and 2, the central axis (4) of the frame structure (1) corresponding to the common central axis of the circular frame outlines (1 a, 1 b) is mounted substantially horizontally on a support (5, 6) for rotation of the frame structure (1) like a wheel.

[0016] Each sliding tube (2) attached to the frame structure (1) includes an inlet connected to a central piece called bifurcator (8) having an axis corresponding to the axis (4) of the wheel shaped frame structure (1). The other end of the sliding tube (2) consisting of the outlet (9) is directed to outside the edge of the frame structure (1). In the example of figure 2, the outlet (9) is placed between the two opposite circular outline frames (1 a, 1b). According to an embodiment, the outlet (9) may also end outside the outline frames (1 a, 1 b). In case of a slide including several tubes, the outlets of a part of the tubes may be directed outside the outline frames (1 a, 1 b) and the outlets of the other part may be directed between them.

[0017] In the example shown by figure 2, a rider accesses to an entry (7) placed at the center of the wheel by a platform (11) with stairs for example. The entry (7) communicates with the bifurcator (8) connected to the inlets of the tubes (2) which the rider chooses for sliding until the outlet (9) while the frame structure (1) rotates about the axis (4). Thanks to the central position of the entry (7), the rider can access to the inlets of the tubes during rotation of the wheel. Exiting the tubes (2) is also possible during rotation, the rider may fall into a static pool (10), or on a damping mattress, or slides until a conveyor synchronized with the wheel peripheral rotation speed.

[0018] One or a plurality of sliding tri-dimensional curved tubes (2) may be attached to a frame structure (1). The rotation of the frame structure (1) provides a compensation of riders height loss during slide, due to upwards movement of the frame structure while riders are sliding inside the tube (s) (2). The curves of the tubes (2) are designed in such a way to be adapted to variable frame rotational speeds providing various speeds and accelerations vectors profiles for riders sliding in the tube (s). For example, tube may be designed for different thrill levels between easy or slow (low thrill) and difficult or fast (high thrill), these tubes being mounted on a same frame structure or wheel. The rotation speed of the frame structure may also vary to provide additional accelerations to the riders according to their position inside the tubes.

[0019] The riders experience thus almost no height loss between the start and the end of the slide. Thanks to the rotation of the frame structure the height of the

slide is much reduced for a given speed and sensations for the riders compared to conventional slides which include also curved tubes but starting from a high tower.

[0020] The sliding tubes (2) are preferably made in colored or transparent plastic or fiberglass material or in any other appropriate material as stainless steel. Their diameter is adapted to the riders which may slide individually or several in parallel or sit in inflatable rings. In case of a waterslide the tubes may include holes for water injection in order to reduce friction. Windows of any shape or lamps may also be added to the sliding tubes for providing visual effects and animations during sliding.

[0021] Figure 3 shows an embodiment of a slide with two opposite wheel shaped frame outlines (1 a, 1 b). The wheels are placed on four external rollers (13) maintained on the ground and configured for driving the rotation of the frame structure (1) about its central axis (4) thanks to a motor (14) installed on one of the rollers (13). This configuration allows a lighter frame structure, and provides possibility to easily exchange the wheel with different sliding tubes configurations.

[0022] The embodiment of figure 4 comprises a frame structure (1) with outline frames in form of a polygon with curved sides. The slide is arranged in a cavity in the ground so that the rotation axis (4) is placed at ground level allowing riders to enter in the tubes without climbing steps, walking a ramp or taking an elevator.

[0023] The sliding tubes may also be open or half circular shaped as illustrated by figure 5 along the entire sliding length or only partly along portions of the sliding path as for example near the inlet or the outlet.

[0024] Figures 6 illustrate a bifurcator (8) to which are connected the inlet (2a, 2b, 2c, 2d, 2e, 2f) of the sliding tubes (2). The riders enters into the entry (7) (arrow 12) and choose a tube for sliding.

[0025] The bifurcator of figure 7 includes two opposite entries (7a, 7b) at each side of the frame structure allowing riders to access in tubes inlets (2a, 2b, 2g, 2h, 2i) leading to tubes directed to opposite axis directions.

[0026] According to an embodiment, the rotating frame structure is configured or is configurable to move laterally according to an axis perpendicular to the rotation axis in order to provide a balancing or shacking movement and additional slope variations in the tubes.

Claims

1. An amusement and leisure slide comprising at least one sliding tube (2) forming a three-dimensional curve attached with fastenings (3) to a frame structure (1) having at least one outline frame (1a, 1 b) of predefined shape and a central rotation axis (4) arranged substantially horizontally **characterized in that:**

- the sliding tube (2) includes a first end forming an inlet (7) arranged in vicinity of the central ro-

tation axis (4) of the frame structure (1) and a second end, distinct from the first end, forming an outlet (9) directed to outside the frame structure (1);

- the curve of the sliding tube (2) is configured to form a sliding path between the inlet (7) and the outlet (9) extending in a volume around the central rotation axis (4) of the frame structure (1), said sliding path being maintained on a variable slope by a rotation of the frame structure (1) about the central rotation axis (4), said rotation being driven by a motor (14).

2. The amusement and leisure slide according to claim 1 **characterized in that** the frame structure (1) is made up of one outline frame (1 a).
3. The amusement and leisure slide according to claim 1 **characterized in that** the frame structure (1) is made up of two opposite outline frames (1a, 1 b) attached together with spacers (1 c).
4. The amusement and leisure slide according to any one of claim 1 to 3 **characterized in that** the outline frame(s) (1 a, 1 b) have a shape selected in the group of circle, star, polygon with rectilinear sides and polygon with curved sides.
5. The amusement and leisure slide according to any one of claim 1 to 4 **characterized in that** the frame structure (1) includes a plurality of sliding tubes (2) which inlets (7) are connected to a bifurcator (8) arranged around the rotation axis (4) of the frame structure (1), said bifurcator (8) including at least one entry (7) for riders.
6. The amusement and leisure slide according to claim 5 **characterized in that** the bifurcator (8) includes two opposite entries (7a, 7b) placed at each side of the frame structure (1) around the rotation axis (4).
7. The amusement and leisure slide according to any one of claim 1 to 6 **characterized in that** the curves of the sliding tubes (2) are designed in such a way to be adapted to variable frame structure rotational speeds providing various speeds and accelerations vectors profiles for riders sliding in sliding the tube (s) (2).
8. The amusement and leisure slide according to any one of claim 1 to 7 **characterized in that** the frame structure (1) is configured or configurable, in addition to the rotation, to move laterally according to an axis perpendicular to the rotation axis (4) and providing a balancing or shacking movement and additional slope variations in the sliding tubes (2).
9. The amusement and leisure slide according to any-

one of claim 1 to 8 **characterized in that** the sliding tube (2) is made up of colored or transparent plastic or fiberglass material or of stainless steel.

10. The amusement and leisure slide according to any- 5
one of claim 1 to 9 **characterized in that** the outlet
(9) of the sliding tubes (2) are directed towards a
static pool (10), or a damping mattress, or a conveyor
synchronized with the rotation of the frame structure
(1). 10
11. The amusement and leisure slide according to any-
one of claim 1 to 10 **characterized in that** the sliding
tube (2) is open or half circular shaped along the
entire sliding path length or partly along portions of 15
the sliding path length.

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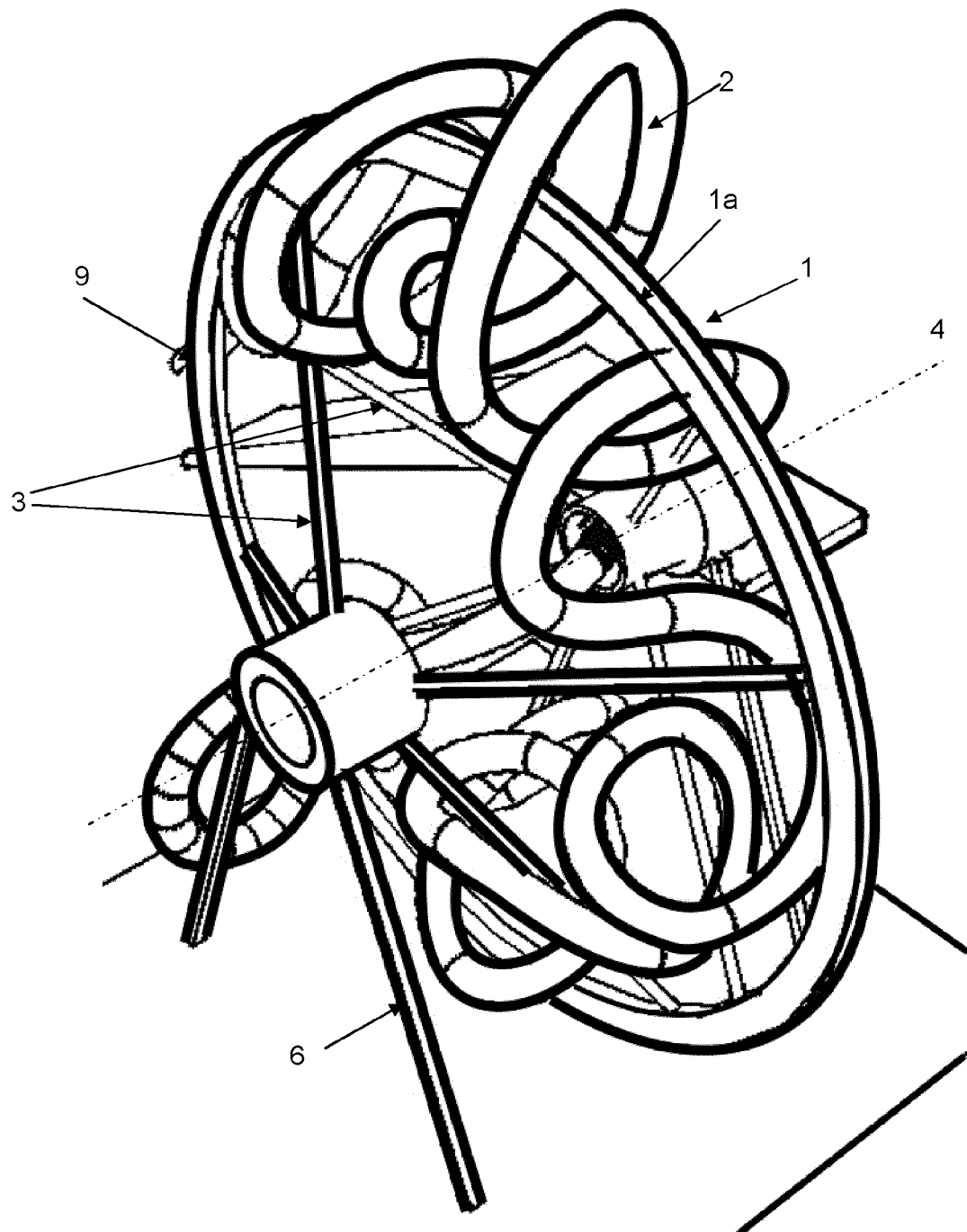


Fig. 1

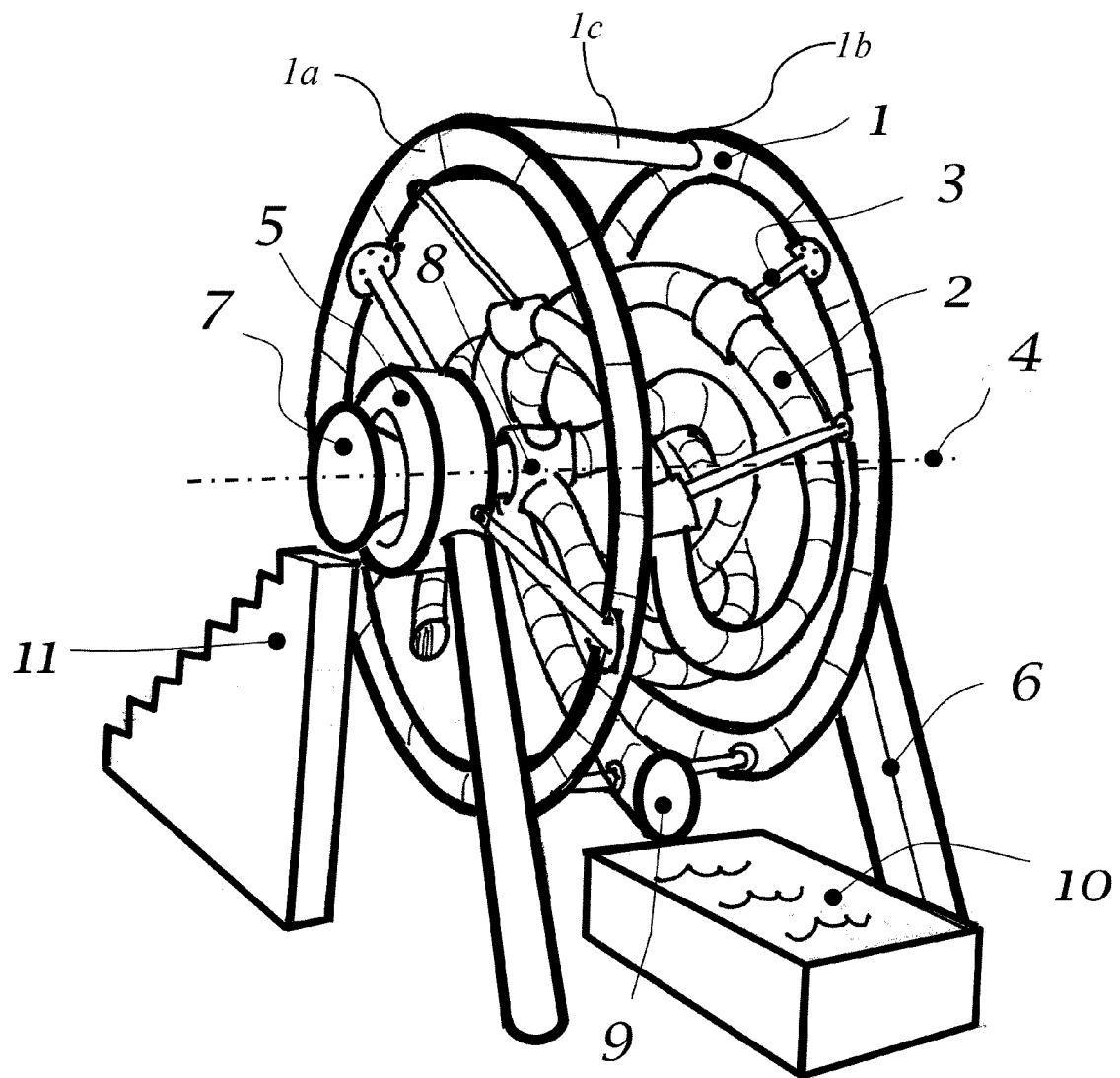


Fig. 2

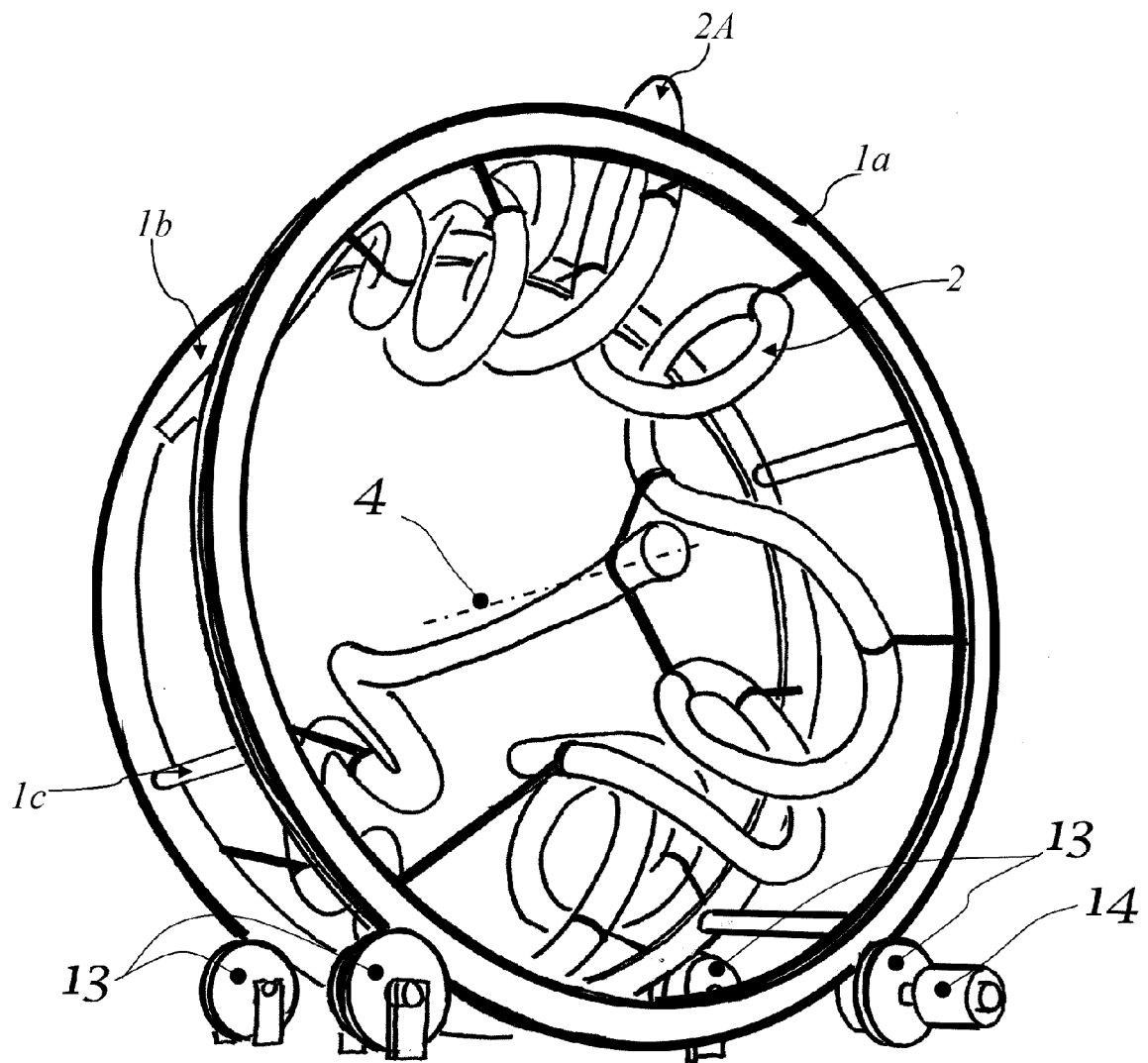


Fig. 3

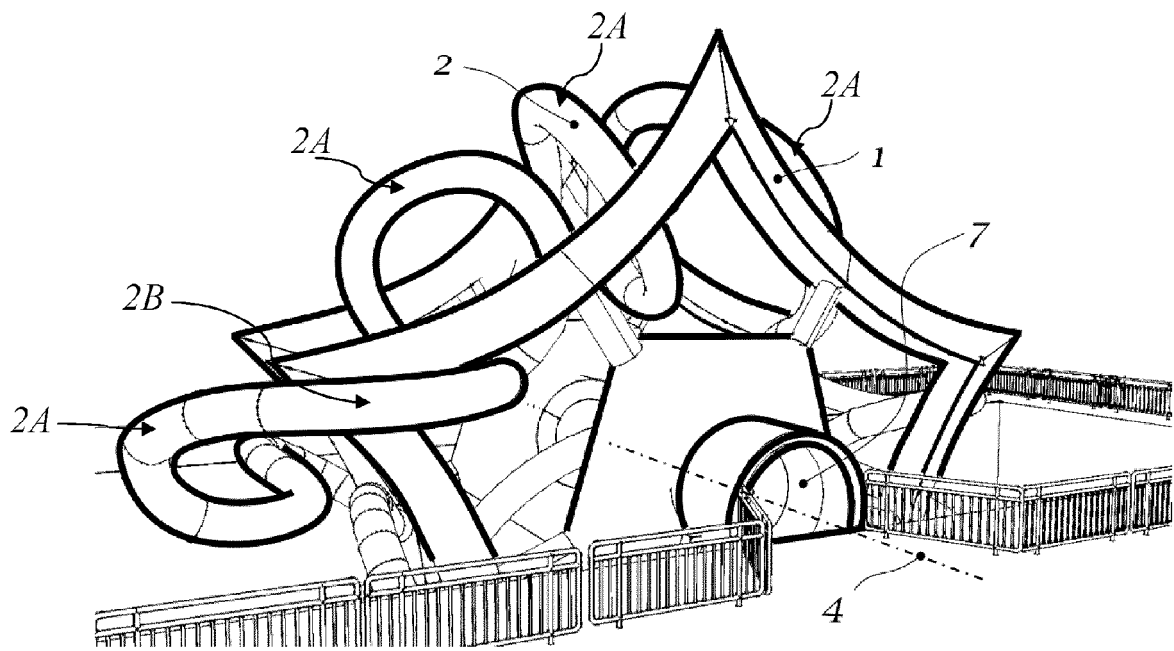


Fig. 4

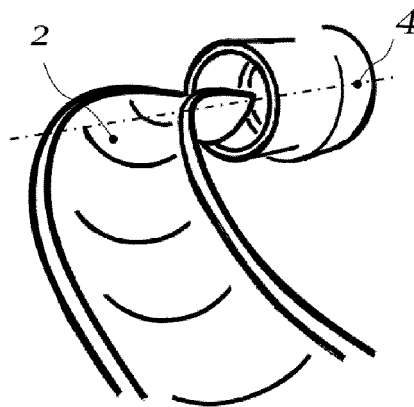


Fig. 5

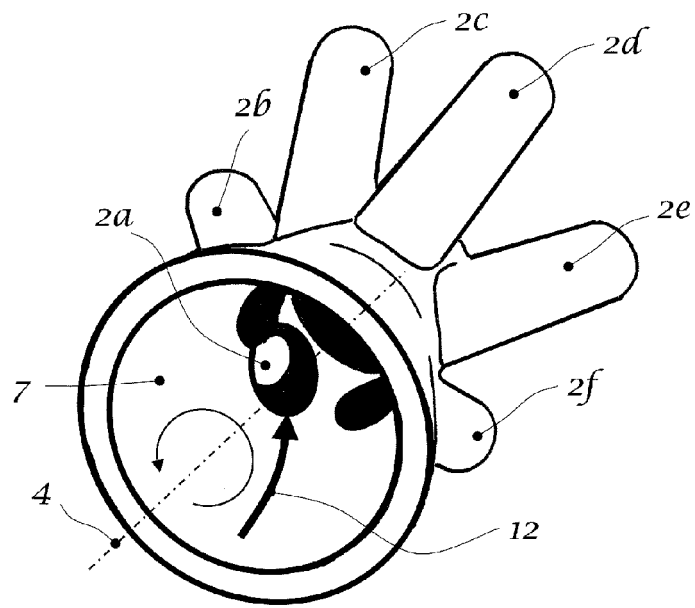


Fig. 6

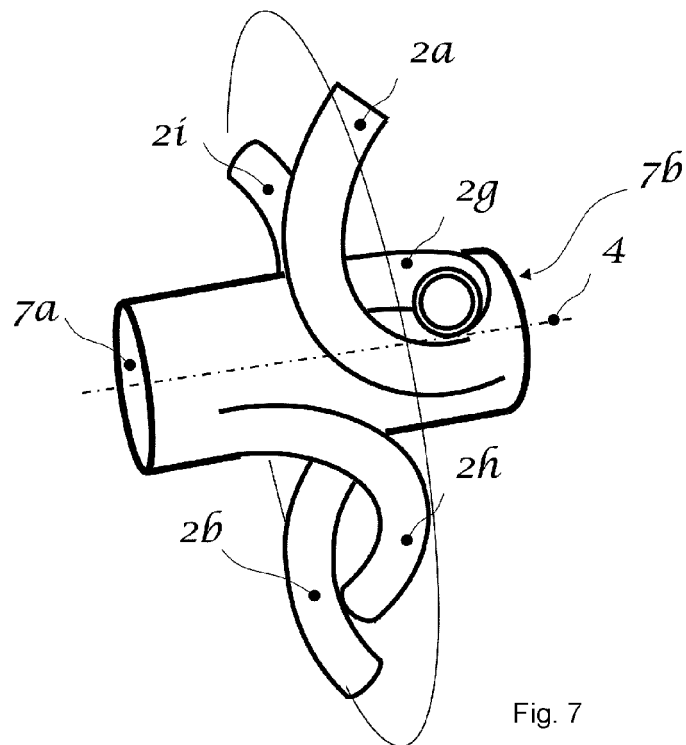


Fig. 7



EUROPEAN SEARCH REPORT

Application Number
EP 12 16 1573

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	Anonymous: "BACKYARD WATERSLIDE SIMULATOR", Grand Idea Studio 21 January 2010 (2010-01-21), XP002679500, Retrieved from the Internet: URL:http://web.archive.org/web/20100121003928/http://www.grandideastudio.com/portfol io/pt-waterslide-simulator/ [retrieved on 2012-07-09] * the whole document *	1-11	INV. A63G21/10 A63G21/14 ADD. A63G21/18
A	US 5 433 671 A (DAVIS WALTER D [US]) 18 July 1995 (1995-07-18) * the whole document *	1-11	
A	US 2006/194638 A1 (HUNTER RICHARD D [CA]) 31 August 2006 (2006-08-31) * paragraph [0029] *	1-11	
			TECHNICAL FIELDS SEARCHED (IPC)
			A63G
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 9 July 2012	Examiner Turmo, Robert
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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EPO FORM 1503 03.82 (P04C01)

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

EP 12 16 1573

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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09-07-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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- WO 2010040978 A1 [0003]
- WO 2009141588 A2 [0004]