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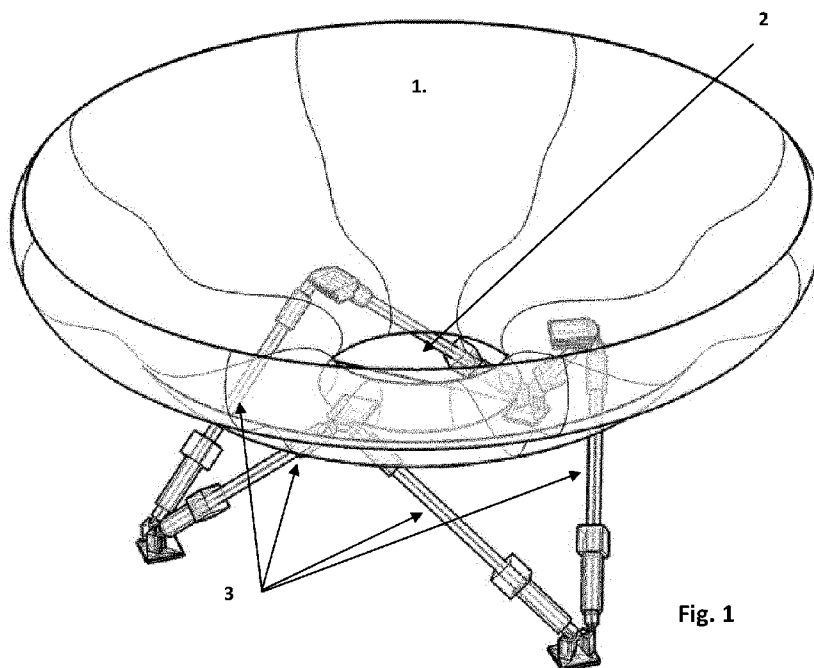


Fig. 1

(57) Abstract: The present invention relates to an amusement and leisure slide for attraction parks, hotels, business or shopping centers with various combinations of thrilling experiences. It is proposed an amusement attraction comprising a sliding section (1) configured to receive a sliding element (9) having an initial speed, the sliding section (1) having on its periphery a slope and being further connected to actuator means (3) adapted to at least move the sliding section with a sequence of lateral movements so as to transfer kinetic energy to the sliding element (9), said lateral movements producing a force (F2) on the sliding element (9) via the slope of the sliding section (1).

MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
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WATER AMUSEMENT ATTRACTION

Introduction

The present invention relates to an amusement and leisure slide for attraction parks, hotels, business
5 or shopping centers with various combinations of thrilling experiences.

Prior art

In the present water slide designs, it is known that a bowl structure is used as an element of the
water slide embodiment. Such bowl-type slides are generally embodied such that the users enter
into the bowl by means of a tangent orbital movement by using a tube before the users exit through
10 a hole provided under the bowl and the users slide in various spiral or elliptic shapes inside the bowl,
and the users finish sliding in a water pool or in a safe area.

In applications where a water pool is not preferred as said safe area, the design of the outlet region
providing exit of the user from the bowl differs. In case the user, who slides in a high speed manner,
does not fall into a water pool, an outlet opening design which will slow down the speed of the user
15 is needed.

In the US patent document US6485372 B2 among the known applications of the art, a waterslide
bowl element is disclosed which has a bottom wall configured to form a throat around a rider exit
opening in the bottom of the bowl. The bowl holds an annular ring of water around the throat that
slows down and conducts the rider to the exit opening and a flume in which the waterslide ride
20 continues. The depth of said annular ring is equal at each point of the annular form.

In the document WO2018/080409, the design relates to a bowl-type water slide for the purpose of
entertainment and having a configuration where the user, who enters into the inlet region at a
predetermined speed, may exit the bowl-type water slide in a safe manner through a narrow outlet
opening provided in the outlet region at the periphery of the bowl.

Summary of the invention

In the previous solutions, the movement of the user is achieved through an initial speed gathered
before entering into the bowl. Once the user is inside the bowl, he stays inside as long as the
momentum acquired by the initial acceleration is sufficient.

The problem to be solved is to provide energy to the user inside the bowl. According to the present
30 invention, a solution is proposed by an amusement attraction comprising a sliding section configured
to receive a sliding element having an initial speed, the sliding section having on its periphery a slope
and being further connected to actuator means adapted to at least move the sliding section with a

sequence of lateral movements so as to transfer kinetic energy to the sliding element, by opposing the movements direction of the sliding section to the centrifugal force of the sliding element.

The key solution of the present invention is to transfer energy to the user or the sliding element by moving and/or tilting the sliding section in accordance with the position of the sliding element.

- 5 For that purpose, the control means should know movement characteristics (such as the position, speed) of the sliding element so that the moving and/or tilting of the sliding section is concurrent with the movement of the sliding element.

Brief description of the figures

The present invention will be better understood thanks to the attached figures in which:

- 10 - figure 1 illustrates the amusement attraction with the sliding section mounted on a frame,
- figure 2 illustrates a cross section of the object of the figure 1,
- figure 3 illustrates the sliding section with an entry slide with lateral exit,
- figure 4 illustrates the sliding section with an entry slide with central exit,
- figure 5 illustrates a top view of the sliding section with a surrounding water channel,
15 - figure 6 illustrates a cross-section of the object of the figure 5,
- figure 7 illustrates the sliding section with an entry slide with surrounding water channel,
- figure 8 illustrates a lateral view of the object of the figure 7,
- figure 9 illustrates a version with an exit opening located on one side of the sliding section,
- figure 10 illustrates the same object as the figure 9 with a different position of the sliding element,
20 - figure 11 illustrates the case with two sliding elements,
- figure 12 illustrates the various positions of the sliding section,
-figures 13 to 16 illustrate the various positions of the sliding element while the sliding section is moved laterally to bring kinetic energy to the sliding element.

Detailed description

- 25 The figure 1 is an overall view of the invention. The sliding section 1, having the shape of a bowl, is mounted on a frame comprising actuators 3. The sliding section 1 can be moved or tilted or a combination of both. By movement, we understand a horizontal movement in X and Y, the attitude of the sliding section being unchanged. By tilting, we understand a change of the attitude of the sliding section, the X/Y position (horizontal) being unchanged. The two modifications of the sliding

section can be combined to move and tilt at the same time. The expression “modify or modification of the sliding section” means moving, tilting or a combination of moving and tilting. To achieve the various tilting orientations of the sliding section, at least two actuators 3 are required. Up to 6 actuators are needed to move and tilt the sliding section 1 in all possible positions and orientations.

5 The sliding section 1 is rigid and extending one actuator in a six actuator's embodiment, has the consequence of inclining the sliding section and thus changing the attitude of the sliding section 1. If the second actuator is also extended, the inclination of the attitude of the sliding section is changed. In the figures, a Stewart platform is represented as a configuration of the 6 actuators, which has the advantage of the symmetry and simplicity. Other serial embodiments of actuators can also be
10 designed.

In the example of the figure 1, the sliding section 1 comprises a central opening 2 to allow the sliding element to exit the sliding section.

The figure 2 illustrates a cross-section of the figure 1 showing the actuators 2 allowing to move and/or tilt the sliding section 1. The sliding section 1 comprises the central opening 2 to let the sliding
15 element leave the sliding section.

The figure 3 illustrates a version with an entry slide 6 located on top of the sliding section 1. The sliding element joins the sliding section through the entry slide 6. Once the sliding element has terminated its journey, the sliding section is modified so that the sliding element exits by the periphery of the sliding section.

20 The figure 4 differs from the figure 3 in the way the sliding elements exits the sliding section 1. In this example, the sliding section is modified so that the sliding element exits through the central opening 2. A camera 5 is located on top of the sliding section to acquire the position of the sliding element.

The figure 5 illustrates an example in which the sliding section 1 is surrounded by a water channel 7.

In a particular mode of the present invention, the movements of the sliding section are
25 preprogrammed and triggered by the entry of the sliding element into the sliding section. The behavior of a standard sliding element is known and the movement of the sliding section can be determined in advance without knowing the position of the sliding element. As soon as the sliding element is detected within the sliding section, the programmed movements applied to the sliding section are started. In order to optimize the expected behavior of the sliding element, the entry of
30 the sliding section comprises a scale to determine the weight of the sliding element. With the weight, the control means can calculate the expected behavior of the sliding element and the movement of the sliding section can be optimized to bring a satisfactorily experience to the user.

In another embodiment, the control of the modification of the sliding section is directly dependent on the sliding element's position. The position of the sliding element can be detected according to various ways. According to a first embodiment, the control means comprises a camera 5 preferably mounted above the sliding section and having a field of view covering the sliding section (see figure 6). The image of the camera is analyzed to detect the position of the sliding element and the position is used by the control means to determine the modification to be applied to the sliding section.

According to another embodiment, the sliding element comprises a beacon which transmits a radio signal. The beacon can be held by a user or be mounted on a sliding vehicle. With the assistance of at least two receivers, the position of the beacon is detected within the sliding section.

10 The figure 12 illustrates the way the attitude of the sliding section is modified. When a sliding element 3 enters the sliding section, the control means detects the position of the sliding element. A sliding element can be one person or a riding vehicle such as a bow or a cart. The user or users are mounted on the riding vehicle to glide within the sliding section.

The control means controls the actuators in order to create a movement such as a change of attitude
15 or a movement. In one example, the change of attitude creates a slope so that the sliding element slides within the sliding section. The path, illustrated by the arrow, is determined by the control means. To understand the way the path is determined, the figure 12 illustrates different positions of the sliding element thus leading to different attitude of the sliding section. The movement of the sliding section (the movement is illustrated by the white arrow) follows the sliding element by
20 creating a constant slope.

Once the position A of the sliding element is detected, the attitude of the sliding section is modified in order to create a decline (or a slope) allowing the sliding element to glide. The control means can determine the temporary target position B by adjusting the attitude of the sliding section. Once the sliding element has reached the position B, the attitude of the sliding section is modified to lead the
25 sliding element to the position C.

The control means can maintain a movement of the sliding element as long as desired. By adjusting the actuators, the sliding element can follow linear and elliptic paths.

According to one embodiment, the speed of the sliding element is determined by the control means, in particular with the means to detect the position. The speed information can be used to anticipate
30 the location of the sliding element during the movement. It is to be noted that the attitude could be constantly modified during the movement of the sliding element and the magnitude of the modification of the attitude can also depend on the speed of the sliding element. The attitude of the sliding section is controlled by the control means so that in the first part of a path A-B, the sliding

element accelerates using the decline of the sliding section. Once the sliding element has reached the half of the journey A-B, the control means changes the attitude of the sliding section to decrease the speed of the sliding element. The speed is controlled in order to avoid that the sliding element is ejected from the sliding section.

- 5 One possible way to exit the sliding section is through an outlet preferably located at the center of the sliding section (see figure 4 for example). The control means can position the sliding section so that the sliding element avoids following a straight line between the initial position A to the target position C passing through the central part of the sliding section. In this way, the sliding element can move as long as the control means calculate an elliptic path. Once the time to enjoy the sliding
10 experience is over, the control means calculates a path that leads to the center of the sliding section at a controlled speed. The central part comprises an outlet in the shape of a tube to allow the sliding element to enter and be evacuated from the sliding section.

- Another way to exit the sliding section is through the periphery of the sliding section (see for example figure 3). The sliding section can be surrounded by a collecting channel (see figure 5 and 6,
15 element 7). Since the control means can control the speed and the position of the sliding element, the attitude can be adjusted so that the sliding element terminates its journey at the periphery of the sliding section at low speed, allowing a smooth transfer from the sliding section to the collecting channel.

- The figures 7 and 8 illustrate the collecting channel 7. The entry into the sliding section is achieved
20 through an entry slide 6. The sliding section 1 has preferably a bowl shape with a surrounding lip 4. During the first part of the journey, the sliding element stays into the bowl part of the sliding section and moves according to the change of attitude of the sliding section. Once the time is over, the attitude is changed so that the sliding element passes the lip of the sliding section and therefore exits the sliding section to arrive into the collecting channel 7.

- 25 The figure 9 and 10 is another example of the movement of the sliding section 1. The sliding element 9 slides along on the wall of the sliding section thanks to the slope created by the tilting of the sliding section. In this example, the exit is one opening into the wall of the sliding section. The figure 10 illustrates the end of the journey and the attitude of the sliding section is changed so that the sliding element is conveyed to the exit. In this example, the exit is connected to the connecting channel as
30 illustrated in the figures 7 and 8.

The figure 11 shows an example of two sliding elements at the same time in the sliding section. As far as the distance between the two sliding elements is small, the control means can determine a movement of the sliding section so that the two sliding elements could move from a position A to a

position B. In the embodiment of the figure 11, the wall of the sliding section comprises a tube 8 to allow the sliding elements entering into the sliding section.

According to one embodiment of the present invention, the sliding section comprises a plurality of water outlets in order to create a water film on top of all or part of the surface of the sliding section.

5 The water outlets are preferably located at the periphery of the sliding section and the water inlets are provided at various portions of the sliding section. In order to optimize the creation of the water film, the control means can also open or close the water inlets and water outlets. In the example of the figure 12, the water outlets close to the position A are open and the water inlets close to the same position are closed so that the water flows from the position A to the position B. At the
10 position B, the water inlets are open to collect the water. When the sliding element reaches the middle of the section A-B, the water outlets are opened around this position to create a film towards the position B. As a general rule the water inlets close to the lowest portion of the sliding section are open and the water outlets upstream to that position are open. According to one embodiment, the water outlets are open below the sliding element and in front the sliding element so as to create the
15 film of water allowing the sliding element to glide on top of the film.

According to another embodiment, the sliding portion is dry and the sliding element comprises wheels allowing it to roll in all directions.

The figure 3 illustrates one example of the sliding section. It is not necessary that the sliding section is flat but can also comprises valleys and hills to create a more exciting path for a user.

20 In this particular configuration, the starting position and the exit can be anywhere along the edge of the sliding section. In case of the absence of a wall terminating the periphery of the sliding section, a collecting channel is positioned so that the sliding element, while exiting the sliding section, joins the collecting channel. In case of the water amusement attraction, the collecting channel is a water channel leading the sliding element to the main exit of the amusement attraction.

25 The figures 13 to 16 illustrate a way to transfer energy to the sliding element 9. The sliding section 1 receives the sliding element 9 with an initial speed. This speed represents the initial kinetic energy. The role of the sliding section is to move in order to maintain or increase the kinetic energy of the sliding section. The figure 13 illustrates the arrival of the sliding element within the sliding section. In view of the slope of the sliding section, the sliding element follows the slope and generates a
30 centrifugal force F1. The illustrated sliding section in the figure 11 is also a good example of the sliding element following the slope or the wall of the sliding section. By following the wall of a round element (or substantially round), the initial speed generates the centrifugal force F1. Without

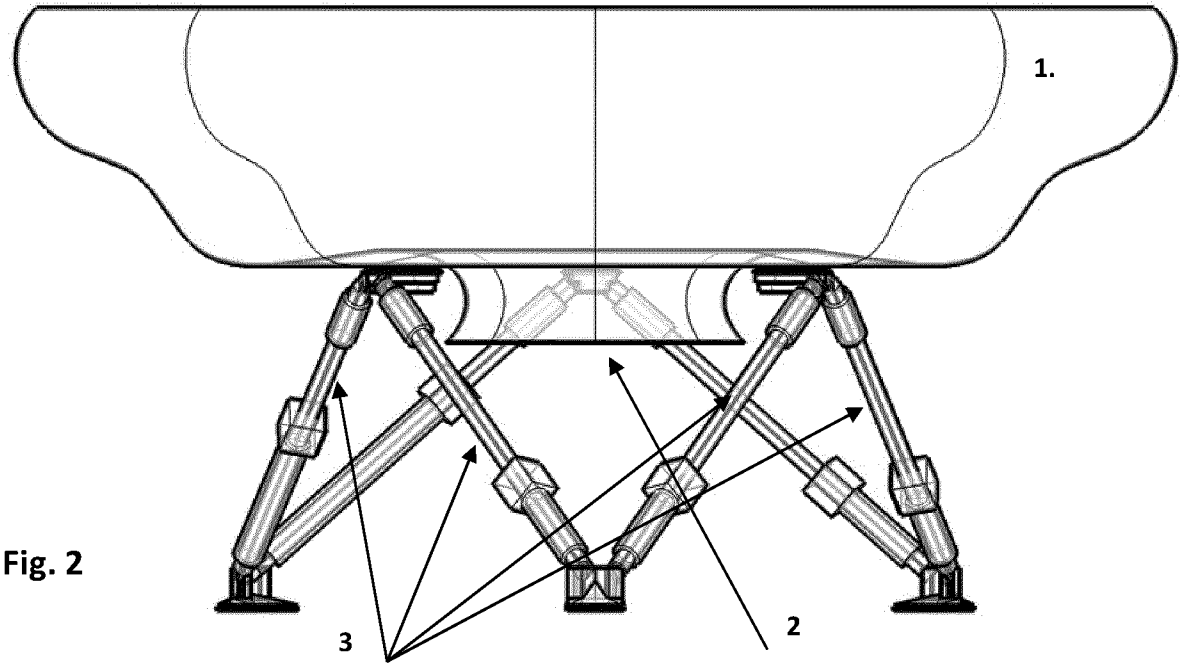
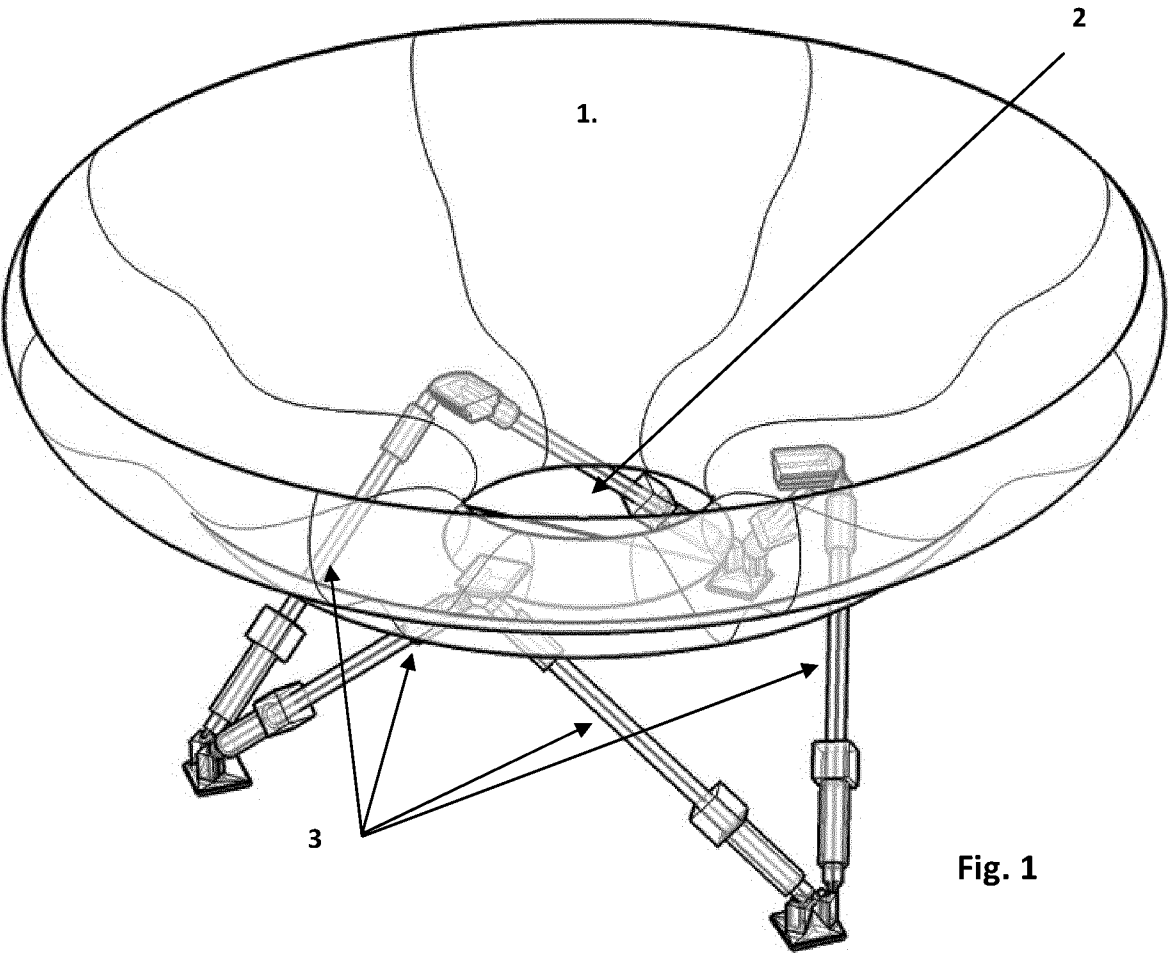
movement, the sliding element will turn within the sliding section until the kinetic energy is zero and the sliding element will be located in the center of the sliding section.

In order to maintain a momentum, the sliding section will move so as to transfer energy to the sliding element. This movement should be synchronized with the position of the sliding element. The figure 5 14 shows a first movement of the sliding section producing a force F_2 applied to the sliding element via the slope of the sliding section. The figure 15 and 16 shows two instances during which the sliding section is moved in accordance with the sliding element's position. Each time the wall of the sliding section is used to move the sliding element in an opposite direction than the centrifugal force. The movement of the sliding section transfers energy to the sliding element and allows it to continue its 10 journey within the sliding section. The amplitude of the movement of the sliding section, thus producing the force F_2 , determines the magnitude of the resulting force F_3 to the sliding element.

Claims

1. An amusement attraction comprising a sliding section (1) configured to receive a sliding element (9) having an initial speed, the sliding section (1) having on its periphery a slope and being further connected to actuator means (3) adapted to at least move the sliding section with a sequence of lateral movements so as to transfer kinetic energy to the sliding element (9), said lateral movements producing a force (F2) on the sliding element (9) via the slope of the slope the sliding section (1).
2. The amusement attraction according to claim 1, further comprising position detection means detecting the position of the at least one sliding element (9) and control means to control the actuator means (3) as a function of the detected position.
3. The amusement attraction according to claim 1 or 2, wherein the lateral displacement of the sliding section (1) transfers energy to the sliding element allowing the sliding element to move into the sliding section.
4. The amusement attraction according to claim 3, in which the actuator means further apply a tilting movement to the sliding section (1) to transfer energy to the sliding element (9).
5. The amusement attraction according to any of the claims 2 to 4, further comprising speed and direction detection means detecting the speed and direction of the at least one sliding element and control means to control the actuator means as a function of the detected position, speed and direction.
6. The amusement attraction according to any of the claims 2 to 5, where the detection means, control means and actuator means are adapted to move the at least one sliding element according to a predetermined speed profile along a predetermined path
7. The amusement attraction according to any of the claims 2 to 6, characterized in that the detection means comprise at least one camera for which the field of view is the sliding section.
8. The amusement attraction according to any of the claims 2 to 6, in which the at least one sliding element comprises a riding vehicle, said riding vehicle comprising a beacon, said detections means comprising a receiver to receive the signal of the beacon and to detect the position of the riding vehicle within the sliding section.
9. The amusement attraction according to any of the claims 1 to 8, in which the sliding section comprises an exit located in the vicinity of the center of the sliding section.

10. The amusement attraction according to any of the claims 1 to 9, in which a starting position of the sliding element is located at the peripheral of the sliding section.
11. The amusement attraction according to any of the claims 1 to 10, in which the sliding section comprises a plurality of water outlets providing a water film on the surface of the sliding section



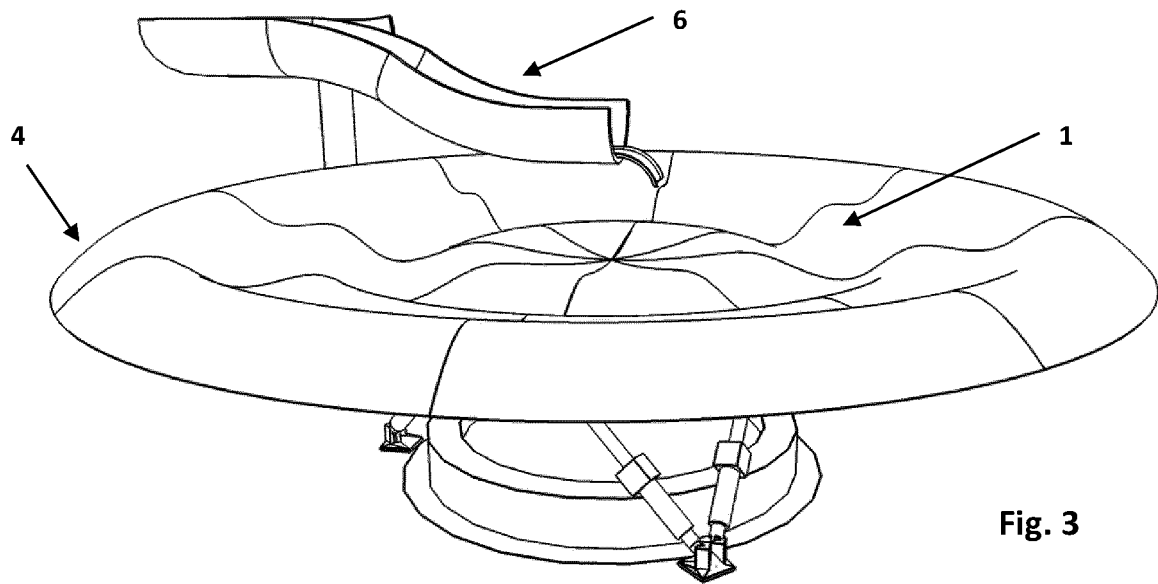


Fig. 3

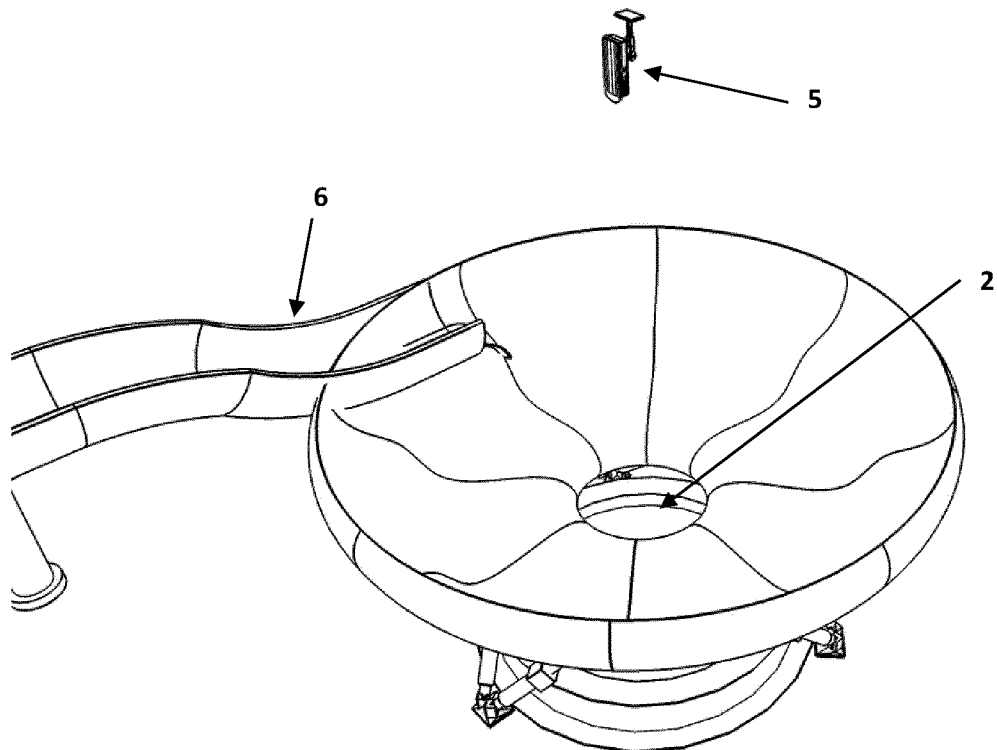
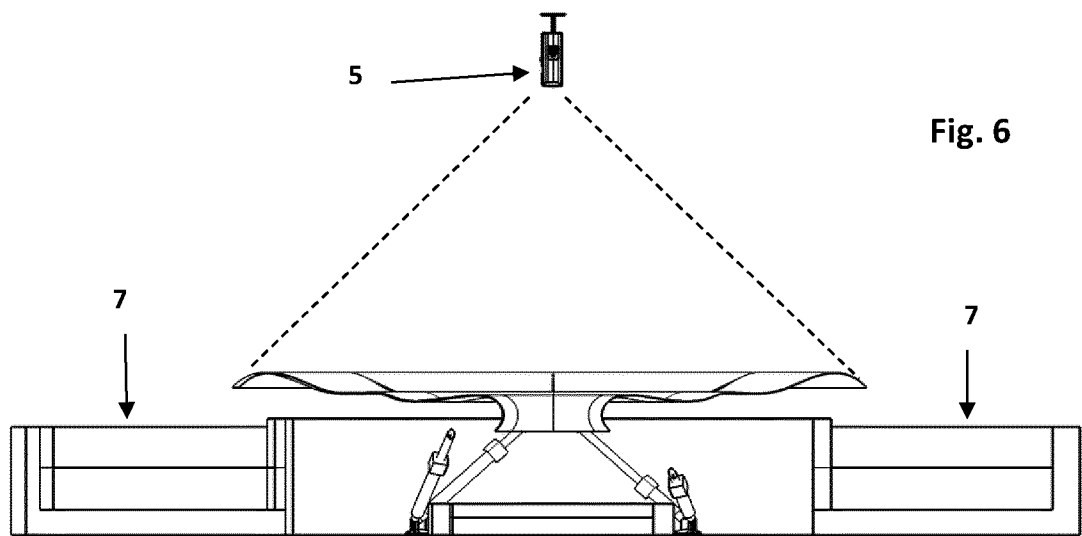
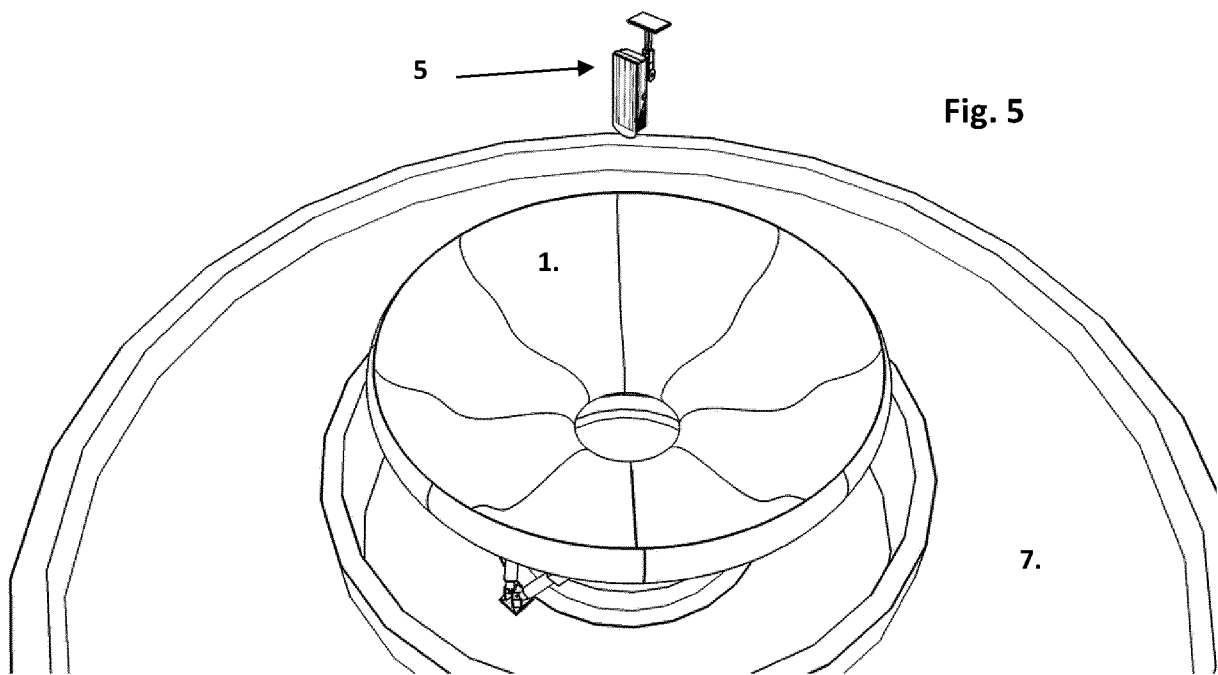


Fig. 4



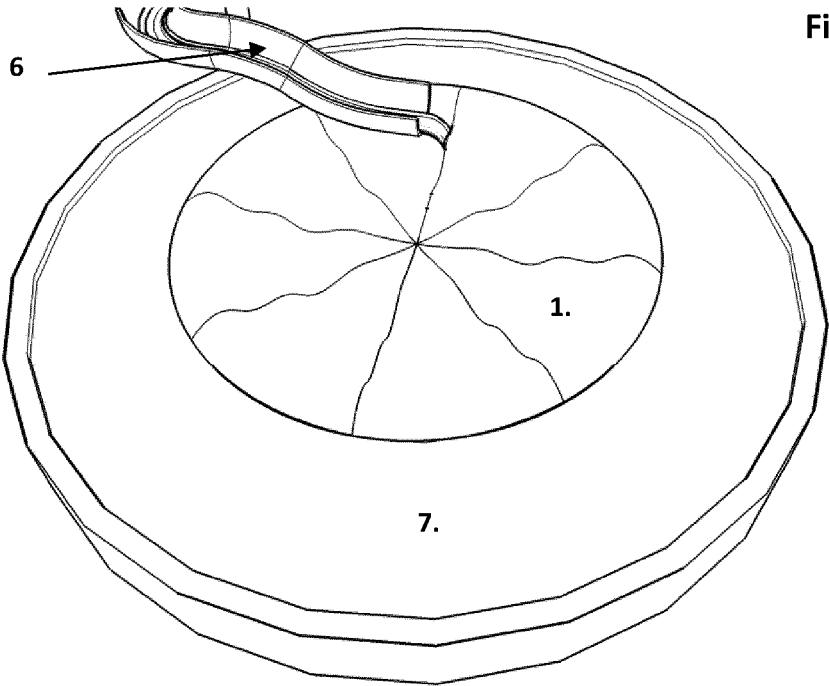


Fig. 7

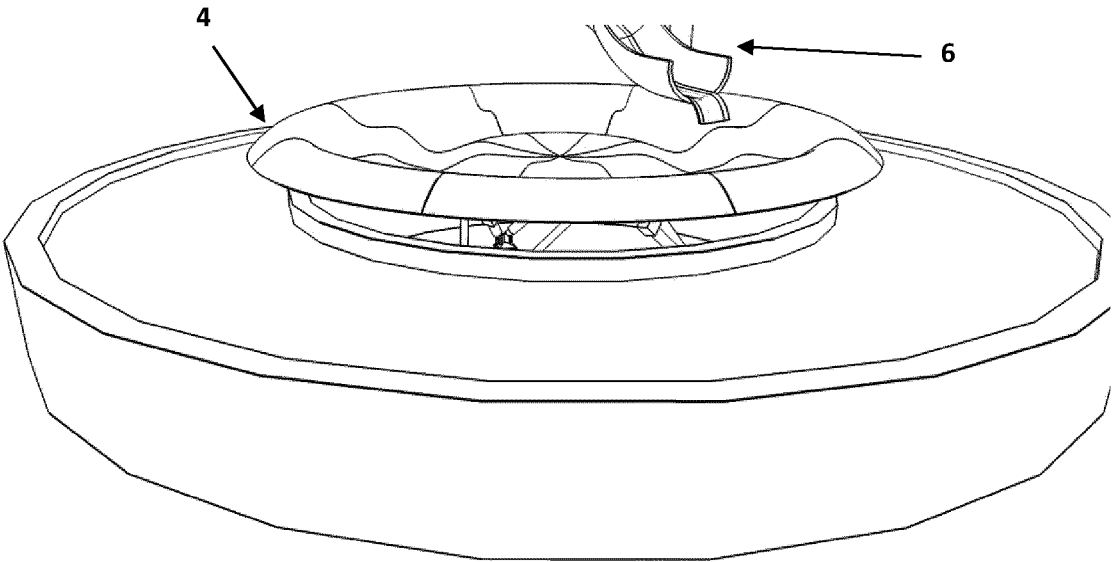


Fig. 8

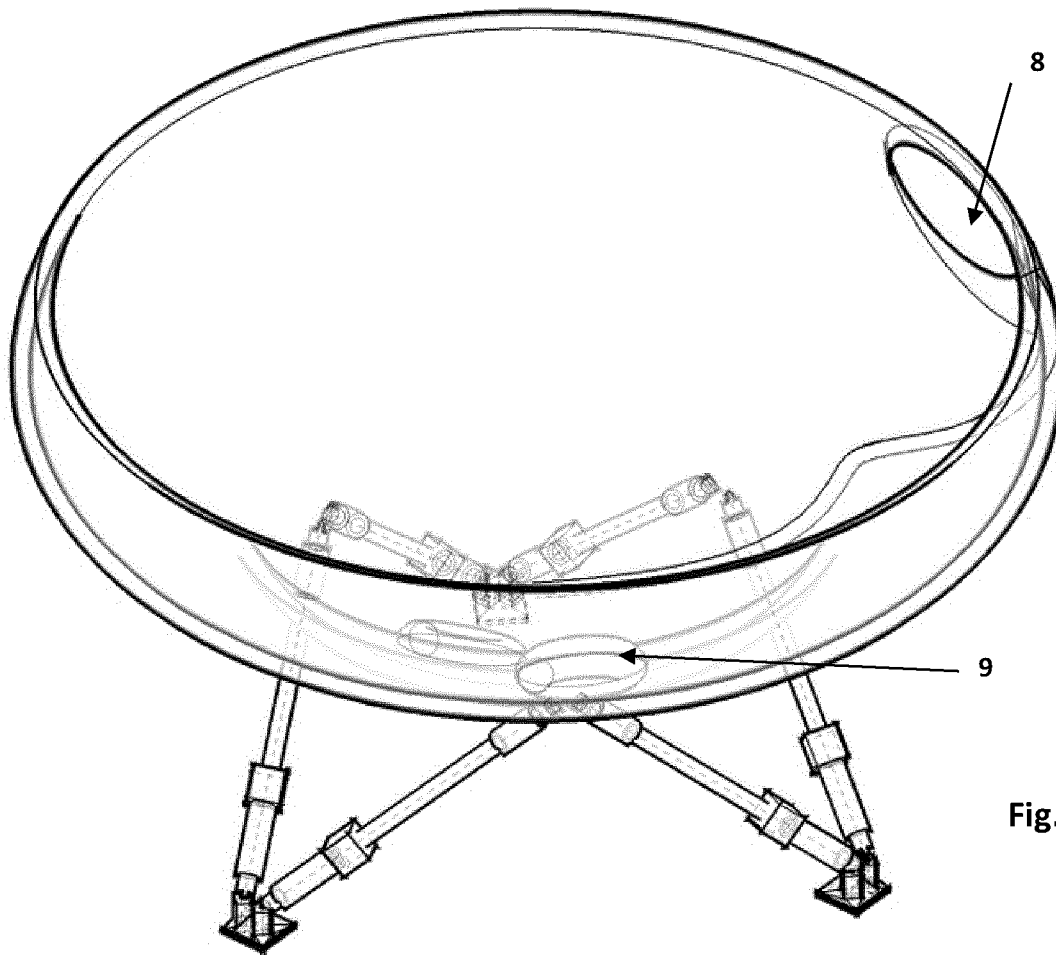


Fig. 9

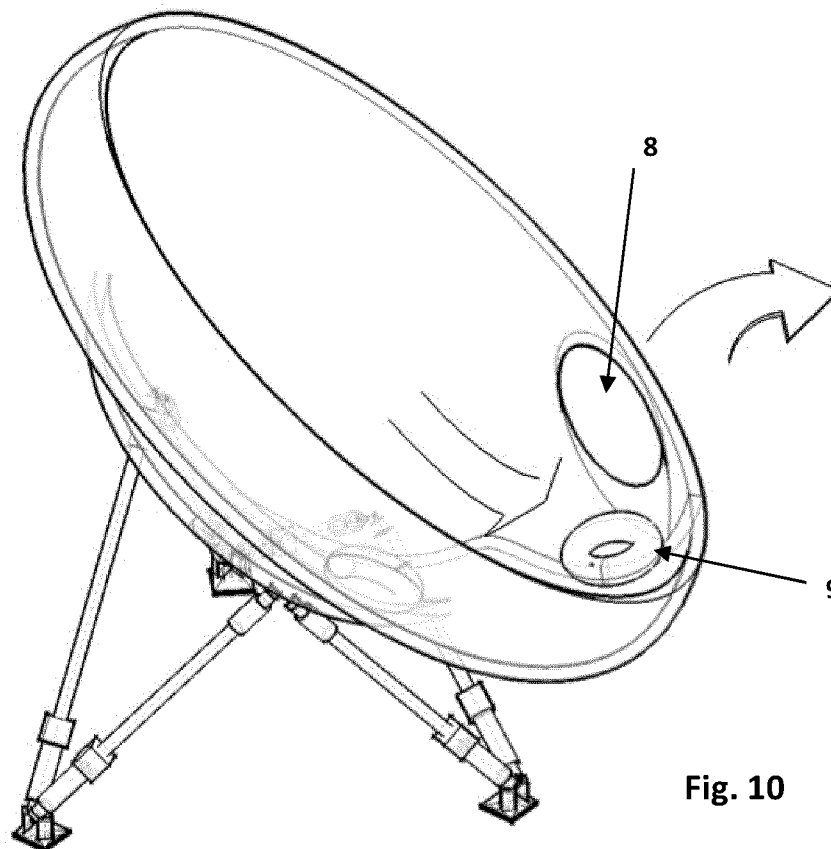


Fig. 10

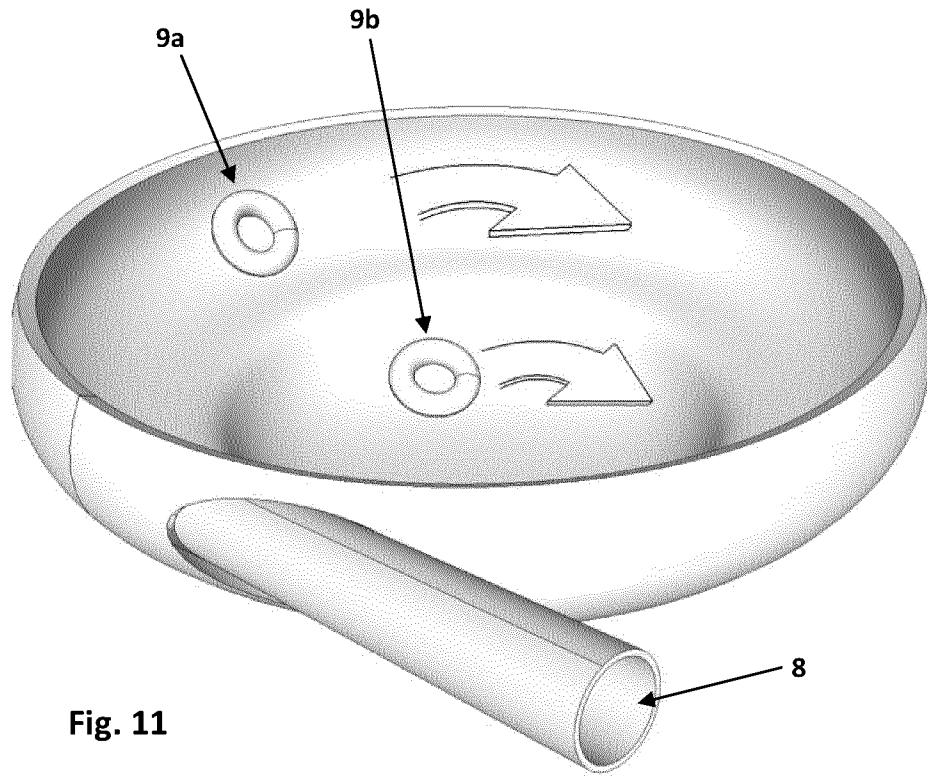


Fig. 11

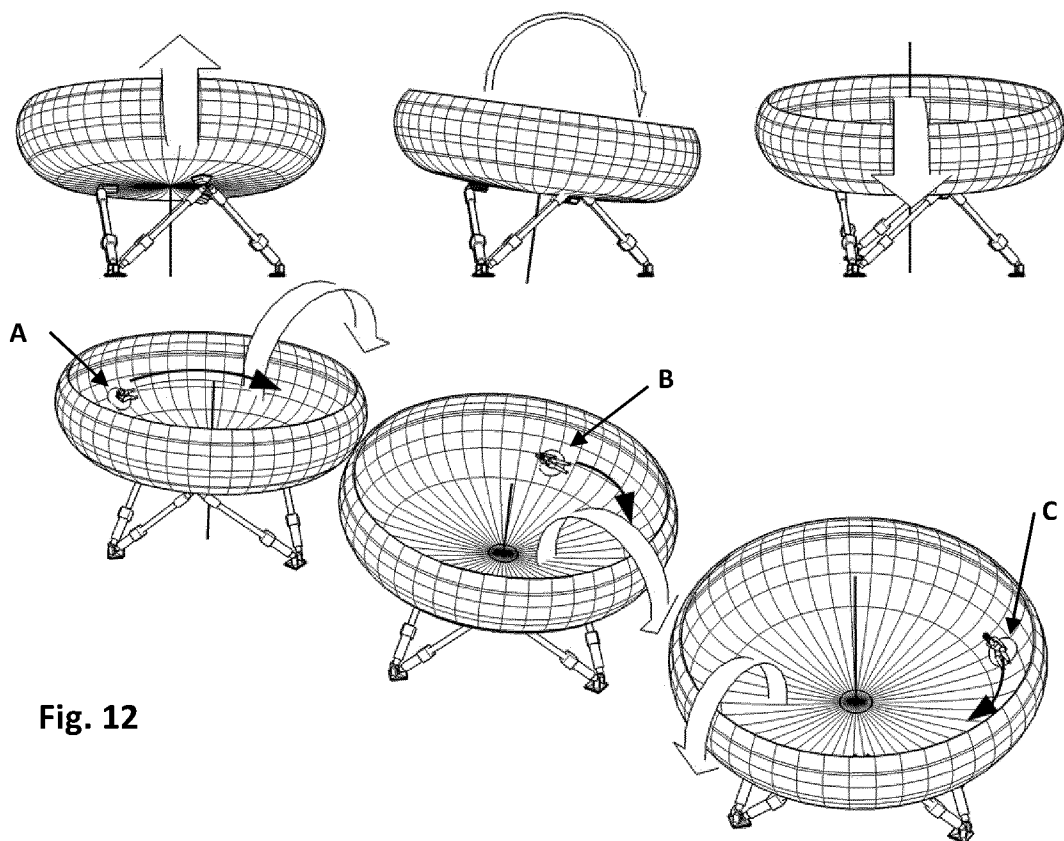


Fig. 12

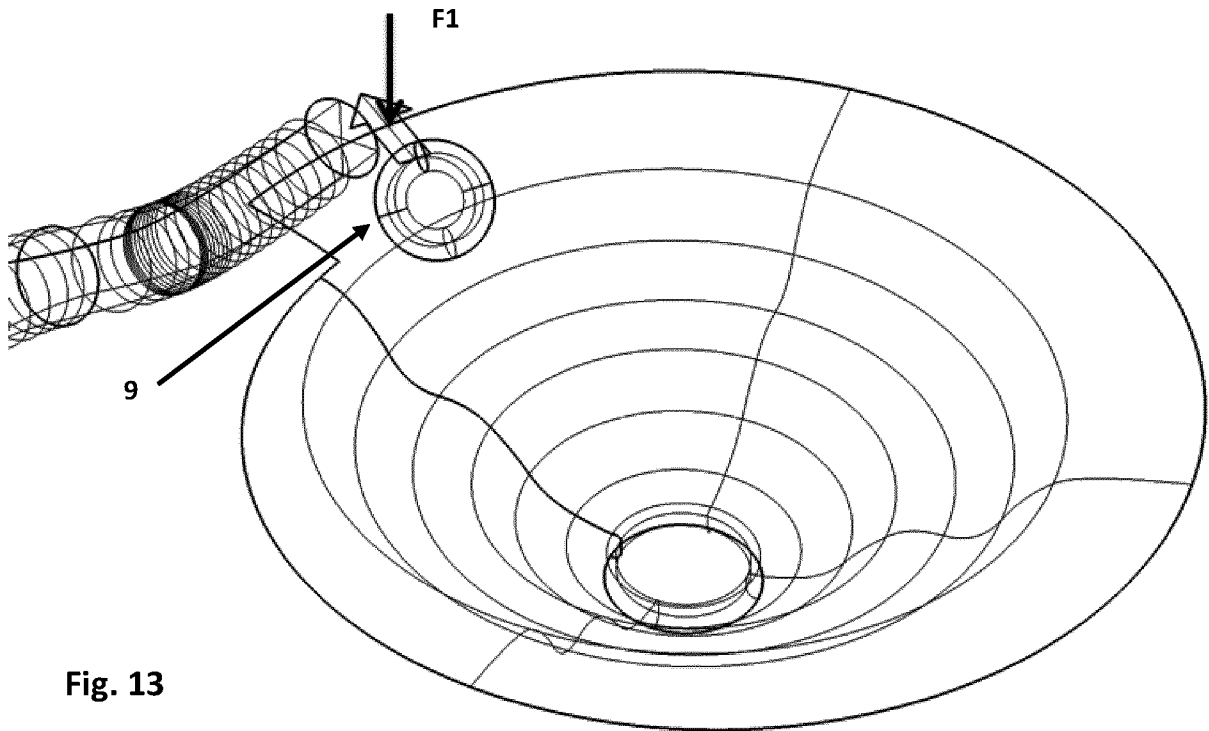


Fig. 13

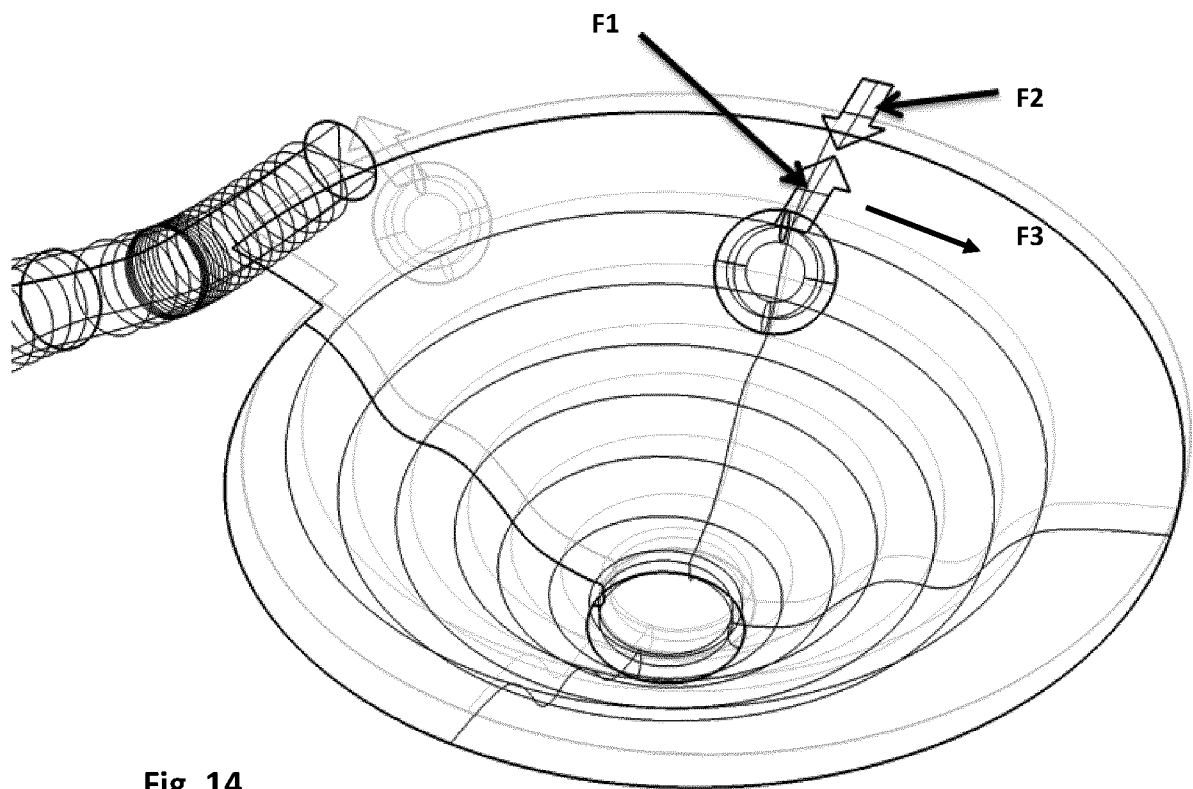
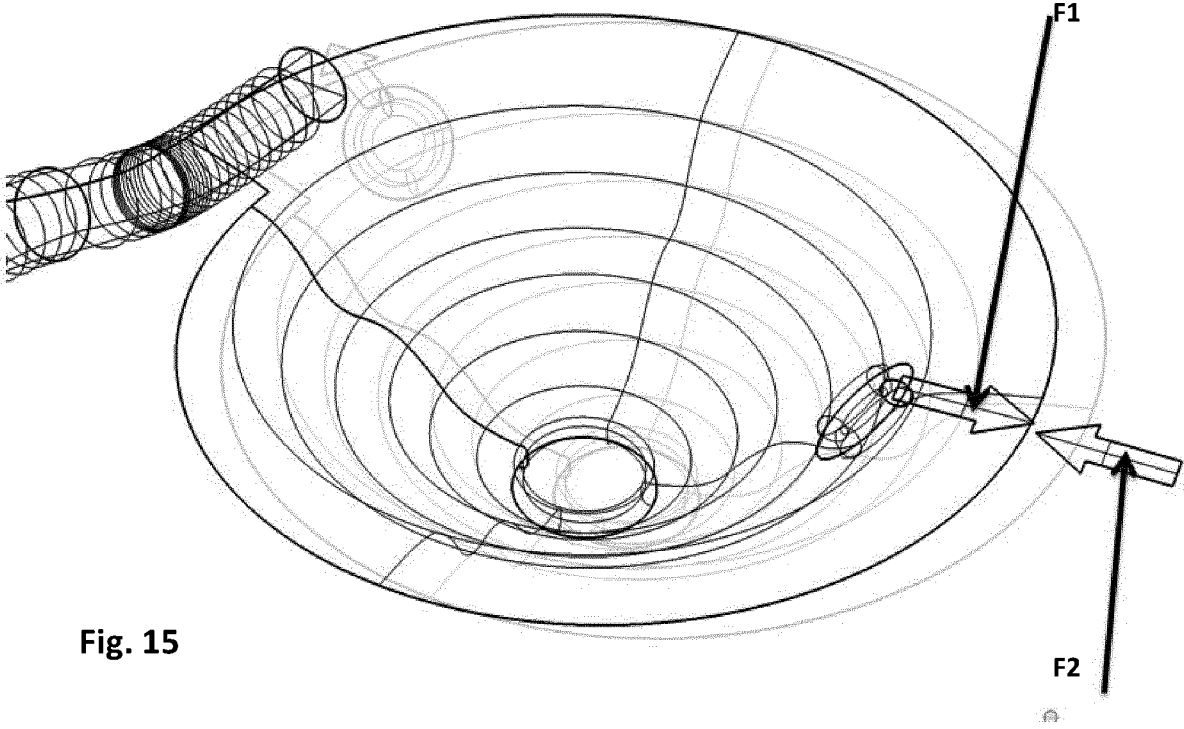
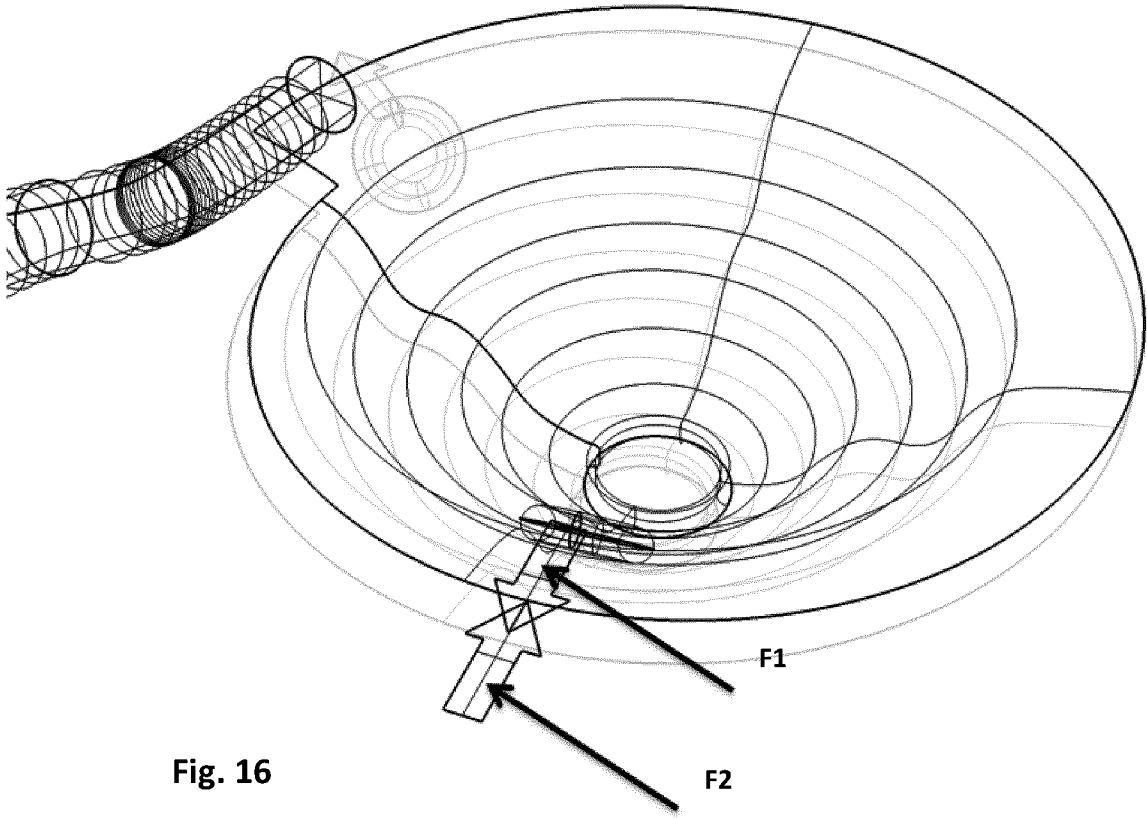


Fig. 14



In



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2020/055215

A. CLASSIFICATION OF SUBJECT MATTER
INV. A63G21/18 A63G3/00 A63G3/02
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A63G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 433 671 A (DAVIS WALTER D [US]) 18 July 1995 (1995-07-18) column 3, line 19 - column 5, line 18; figures 1,2	1-11
A	----- US 2 806 697 A (ROBERT HUHN ET AL) 17 September 1957 (1957-09-17) column 2, line 25 - column 4, line 29; figures 1,2	1-11
A	----- US 2016/136529 A1 (WESTON DENISE CHAPMAN [US] ET AL) 19 May 2016 (2016-05-19) column 203 - column 214; figure 23 paragraph [0116] - paragraph [0117]; figures 2b,23,25 paragraph [0117] paragraph [0203] - paragraph [0214] ----- -/-	1-11



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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Date of the actual completion of the international search

5 May 2020

Date of mailing of the international search report

13/05/2020

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2020/055215

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 7 780 537 B2 (WHITEWATER WEST IND LTD [CA]) 24 August 2010 (2010-08-24) abstract; figures 2,3 -----	1-11

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2020/055215

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5433671	A	18-07-1995	CA 2122946 A1 28-06-1995 NL 9401739 A 17-07-1995 US 5433671 A 18-07-1995
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