(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 821 116 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
07.01.2015 Bulletin 2015/02

(51) Int Cl.:
A63G 31/16 *(2006.01)*

(21) Application number: **14175263.4**

(22) Date of filing: **01.07.2014**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **02.07.2013 US 201313933641**

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(54) **Attraction for amusement rides based on motion simulation**

(57) The present invention relates to an attraction for amusement rides based on motion simulation, including a support (2) to be placed in front of a projection screen (100), a lifting arm (5) that is rotatabely attached to the support, and a frame (3) attached to one end of the lifting arm. The frame comprises one or more pivotable supporting arms (4) having one or more rows of passenger seats (10) mounted thereon. The invention includes a first drive (6) for rotating the lifting arm with respect to the support to move the seats between a boarding position in which the seats are accessible for passengers and a viewing position in which the seats face the projection screen and means for moving the seats relative to the projection screen in the viewing position in accordance with a sequence of images displayed on the projection screen.

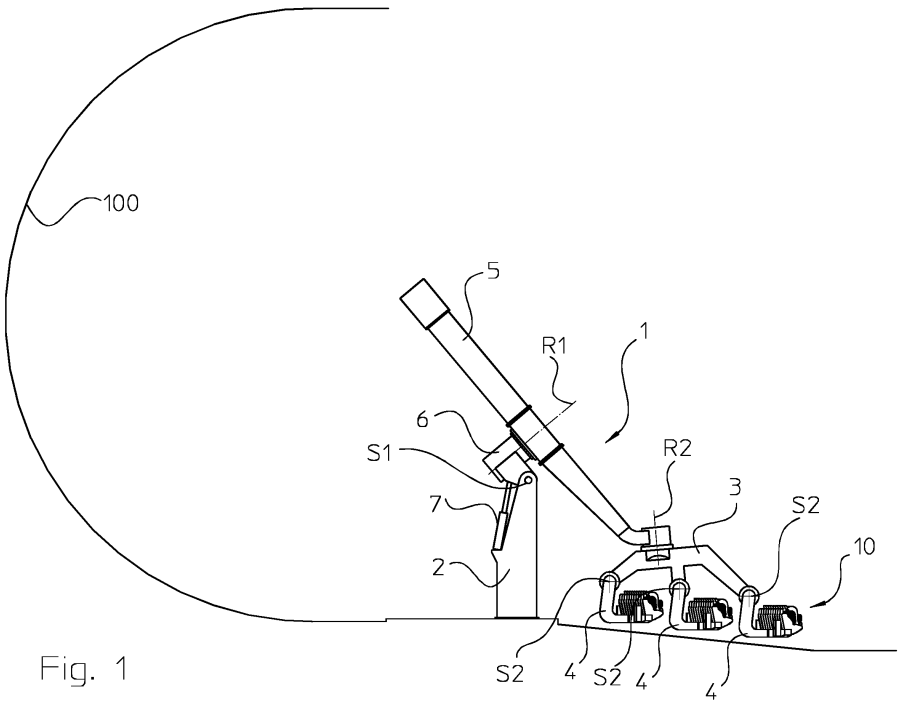

Fig. 1

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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to an attraction for amusement rides based on motion simulation. In motion simulators, mechanical motion is combined with visual display to provide passengers with the experience of being in a vehicle moving over land or water or through the sky. The present invention is more specifically related to an attraction for amusement rides based on motion simulation that is suitable as a mobile attraction, for instance a fairground attraction, and as a fixed attraction, for instance an amusement park attraction, or for use at a theme park to give the park guests a themed simulation of motion.

[0002] In current times, many theme park attractions use motion simulation. So called 4D films are shown in theater systems of which the seats can be set in motion relative to a projection screen present in front of the moving seats. The effect of the motion simulation remains limited, as the viewers of 4D films remain on the ground during the simulation.

[0003] In one type of known simulator, carriages or mobile cranes are moved along a track passing themed scenes and projection screens. These known rides offer a more intense effect, but still passengers remain aware of their surroundings. Furthermore these known simulator rides have a complex design and generally occupy a large amount of space. In this type of known simulator ride, the necessary mechanical movements are typically more advanced than the visual display itself.

[0004] In another type of known simulator ride, seats are moved relative to a projection screen by guiding them along a fixed hanger structure that is situated in front of a large dome-shaped projection screen. Clearly, in this type of simulator ride, the visual display is more advanced than the mechanical movement, as the latter is limited to the hanger structure.

[0005] This Background section represents the observations of the inventors, which are provided as a guide to the reader in attempting to search for and identify any prior art of interest. However, nothing in this Background section is intended to be or to accurately describe such prior art. In particular, the reader interested in prior art is advised to perform a prior art search, using the foregoing only as a search guide, not as prior art.

SUMMARY OF THE INVENTION

[0006] The present invention has for its object to provide an attraction for amusement rides based on motion simulation that offers passengers a fully immersive experience using advanced visual display in combination with advanced mechanical movement. The illustrated embodiment of the invention comprises a projection screen, a support to be placed in front of a projection screen, and a lifting arm that is rotatabely attached to the support. A frame is attached to one end of the lifting arm, the frame comprising one or more pivotable supporting arms having one or more rows of passenger seats mounted thereon. A first drive is provided for rotating the lifting arm with respect to the support to move the seats between a boarding position in which the seats are accessible for passengers and a viewing position in which the seats face the projection screen. The exemplary embodiment further includes means for moving the seats relative to the projection screen in the viewing position in accordance with a sequence of images displayed on the projection screen.

[0007] The rotatable lifting arm allows for a more advanced mechanical movement of the seats. During movement of the seats from the boarding position of the attraction to the viewing position, the rotation of the seats provides the passengers with an additional sensation at the beginning of the ride. In the viewing position, the rotatable lifting arm provides an extra degree of freedom of mechanical movement in synchronization with material being shown on the visual display. Preferably, the seats face away from the projection screen in the boarding position, thus enhancing the extra sensation by adding a surprising effect when moving to the viewing position. In the preferred embodiment, the seats follow at least part of a helical path during movement to the viewing position causing the passengers to spiral upwards towards the projection screen.

[0008] According to an even more sensational preferred embodiment, the frame is rotatably attached to the lifting arm. The rotating frame offers an extra degree of freedom of mechanical movement of the seats during movement towards the viewing position, as well as after the seats are in the viewing position.

[0009] The attraction allows the seats to follow a natural continuous path in a further preferred embodiment wherein the first drive is arranged to rotate the lifting arm over 360 degrees. To achieve a highly effective immersive experience for the passengers, the projection screen is a dome-shaped projection screen offering an uninterrupted visual display. In keeping with a practical preferred embodiment, the supporting arms are situated in pairs relative to a longitudinal direction of the frame, wherein each supporting arm has a row of passenger seats mounted thereon. Advantageously, the seats are oriented in substantially parallel rows facing the same direction as in a theatre.

[0010] Depending on the surroundings, the attraction may comprise a second drive for tilting the lifting arm to move the seats between the boarding position and an intermediate position in which the seats are elevated and wherein the first drive is arranged to move the seats between the intermediate position and the viewing position. The seats may now rotate without the risk of touching objects on the ground, such as a platform. Such a platform may be comprised in the attraction onto which platform the projection screen and the support are placed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The invention will now be further elucidated with reference to the accompanying figures, in which:

Figure 1 is a schematic side view of a first preferred embodiment of the motion simulator, according to an embodiment of the invention, when in the boarding position;

Figure 2 shows the motion simulator of Figure 1 in the intermediate operating position; and

Figure 3 shows the motion simulator of Figure 1 in the viewing position.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0012] Turning now to the figures, Figure 1 shows an attraction for amusement rides according to the invention in a first preferred embodiment. The Attraction 1 is a motion simulator suitable as a mobile attraction, for instance as a fairground attraction, and as fixed attraction, for instance as an amusement park attraction. Figure 1 shows the attraction 1 in the boarding position, while Figures 2 and 3 show the attraction 1 in operation in an intermediate position and in a viewing position respectively.

[0013] In the boarding position, seats 10 are accessible to the passengers. In the preferred embodiment shown, attraction 1 is provided with a platform 101. This platform 101 allows passengers to board the seats 10. In the shown preferred embodiment, seats 10 are received in rows. For safety purposes the seats 10 are provided with safety bars.

[0014] In the figures, a dome-shaped projection screen 100 is shown. Projection screen 100 is situated at one side of the platform 101 and is preferably attached to the platform. Projection screen 100 is suitable for receiving video signals and projecting the video signals as sharp images in a large format. Generally the video signals are accompanied by audio signals that will be broadcasted simultaneously. Suitable techniques are available in the relevant art, for example IMAX technology.

[0015] A support, in the form of an upright or mast 2, is placed in front of the projection screen 100. Preferably the mast 2 is situated on the platform 101 and extends in substantially vertical direction with respect to the platform 101.

[0016] A lifting arm 5 is mounted on the mast 2, such that it can rotate around an axis of rotation R1. In the preferred embodiment shown, the lifting arm 5 can be rotated by means of a first drive 6 with respect to the mast 2. The first drive 6 preferably comprises an electric motor, a bearing and/or a gear rim. Preferably the lifting arm 5 is configured to be tilted around pivot point or hinge S1 on mast 2 by means of a second drive 7. The second drive 7 comprises hydraulic cylinders in an embodiment.

[0017] As noted above, a frame 3 is attached to one end of the lifting arm 5. The frame 3 comprises one main longitudinal bar to which a number of transverse bars 14 are attached at a predefined mutual distance. In the preferred embodiment shown, three transverse bars 14 are attached to the frame 3. Each transverse bar 14 carries supporting arms 4 at its outer end. The supporting arms 4 are pivotally attached to the transverse bars 14 at pivot points or hinges S2. Each supporting arm 4 has a row of passenger seats 10 mounted thereon. The seats 10 are arranged in pairs of rows as in a theatre. Preferably the frame 3 is rotatabely attached to the lifting arm 5 and can rotate around an axis of rotation R2.

[0018] Frame 3 is also referred to herein as a gondola frame. The gondola frame 3 takes up a substantially horizontal orientation in the boarding position. The seats 10 are freely pivotable and automatically take up a level orientation. In the preferred embodiment shown, all seats 10 face away from the projection screen 100 in the boarding position.

[0019] As shown in Figure 2, the lifting arm 5 is tilted to an intermediate position in which the seats 10 are elevated with respect to a ground or resting surface, in this example with respect to platform 101. In this position, the gondola frame 3 takes up a tilted orientation. The seats 10 automatically take up a level orientation as they are freely pivotable around transverse bars 14. The passenger seats 10 may still face away from projection screen 100, but may also be rotated around rotation axis R2 towards projection screen 100. Cylinders 7 of the second drive are locked in position ensuring that lifting arm 5 maintains its tilted intermediate position.

[0020] As shown in Figure 3, lifting arm 5 is rotated by first drive 6 towards the viewing position. During rotation, the seats 10 follow a semi circle, but are also moved upwards due to the tilted orientation of the lifting arm 5. The movement of the seats 10 can best be described as following part of a helical path. In the viewing position, the gondola frame 3 takes up a substantially vertical orientation. As the supporting arms 4 are freely pivotable, the seats will take up a level orientation and are positioned substantially in parallel rows, one above the other in this position. While the system is in this position, all passengers in attraction 1 have an unobstructed view on projection screen 100.

[0021] While in the viewing position, the seats 10 may be moved relative to the projection screen 100 in accordance with a sequence of images displayed on the projection screen 100. Suitable means for coordinating the mechanical movement of the seats 10 with the visual experience are known in the relevant art. The attraction according to the invention allows for moving the seats 10 with many degrees of freedom of movement supporting an optimal coordination of mechanical movement and visual display. Mechanical movement can be realized by actuating any combination of: the pivoting points S2 of supporting arms 4 on bars 14, the rotation of frame 3 around rotation axis R2, the rotation of lifting arm 5 around axis R1 and the pivoting point S1 defining the tilted orientation of lifting arm 5 with respect to mast 2.

[0022] Optionally, an additional degree of freedom of

movement can be provided in the longitudinal direction of the supporting arms 4 as indicated by arrow R3. Such rectilinear or vertical guidance can, among others, be realized by means of a telescopic construction and/or a spring-loaded construction of the supporting arms 4.

[0023] In addition to the above mechanical motion, other tactile effects can be added to enhance the sensation of the passengers. For example, an air flow can be blown towards the passengers in the seats. This air flow may contain a scent suited to the displayed images. Moreover, instead of air or in combination with air, water can be sprayed in the direction of the passengers' seats. The motion simulation can thus be made even more realistic using these additional techniques that are known per se in the relevant art.

[0024] Near the end of the ride, the seats need to return to the boarding position so the passengers can leave the attraction 1. In the preferred embodiment shown, lifting arm 5 is rotated by first drive 6 with respect to support 2. The first drive 6 may be arranged to rotate the lifting arm 5 over 360 degrees to the intermediate position. Alternatively, the first drive 6 may return the lifting arm 5 to the intermediate position by rotating the lifting arm 5 backwards over 180 degrees along the same helical path. The electromotor may then be replaced by additional hydraulic cylinders. In the intermediate position, the cylinders of the second drive 7 will be unlocked and may return the lifting arm 5 to the boarding position.

[0025] It is noted that the second drive 7 is optional and may be dispensed with, for instance in the event a retracting platform is used. The attraction 1 may then be moved between two positions by rotation: the boarding position and the viewing position.

[0026] The present invention is of course not limited to the shown and described embodiments, but comprises any variations evident to the skilled person that fall within scope of protection of the appended claims as seen in the light of the accompanying figures.

Claims

1. An attraction for amusement rides based on motion simulation, comprising a support configured for placement in front of a projection screen;
   a lifting arm that is rotatabely attached to the support;
   a frame attached to one end of the lifting arm, wherein the frame comprises one or more pivotable supporting arms having one or more rows of passenger seats mounted thereon;
   a first drive for rotating the lifting arm with respect to the support to move the seats between a boarding position in which the seats are accessible for passengers and a viewing position in which the seats face the projection screen; and
   means for moving the seats relative to the projection screen in the viewing position in accordance with a sequence of images displayed on the projection screen.

2. The attraction as claimed in claim 1, wherein the attraction comprises a second drive for tilting the lifting arm to move the seats between the boarding position and an intermediate position in which the seats are elevated and wherein the first drive is arranged to move the seats between the intermediate position and the viewing position.

3. The attraction as claimed in claim 1 or 2, wherein the seats face away from the projection screen in the boarding position.

4. The attraction as claimed in claim 1, 2 or 3, wherein the seats follow at least part of a helical path during movement to the viewing position.

5. The attraction as claimed in one or more of the preceding claims, wherein the frame is rotatabely attached to the lifting arm.

6. The attraction as claimed in one or more of the preceding claims, wherein the first drive is arranged to rotate the lifting arm over 360 degrees.

7. The attraction as claimed in one or more of the preceding claims, wherein the supporting arms are situated in pairs as seen in a longitudinal direction of the frame, wherein each supporting arm has a row of passenger seats mounted thereon.

8. The attraction as claimed in one or more of the preceding claims, further comprising a projection screen, wherein the projection screen is a dome-shaped projection screen.

9. The attraction as claimed in one or more of the preceding claims, wherein the attraction further comprises a platform onto which the support is placed.

10. The attraction as claimed in claim 9, wherein the projection screen is placed against one end of the platform.

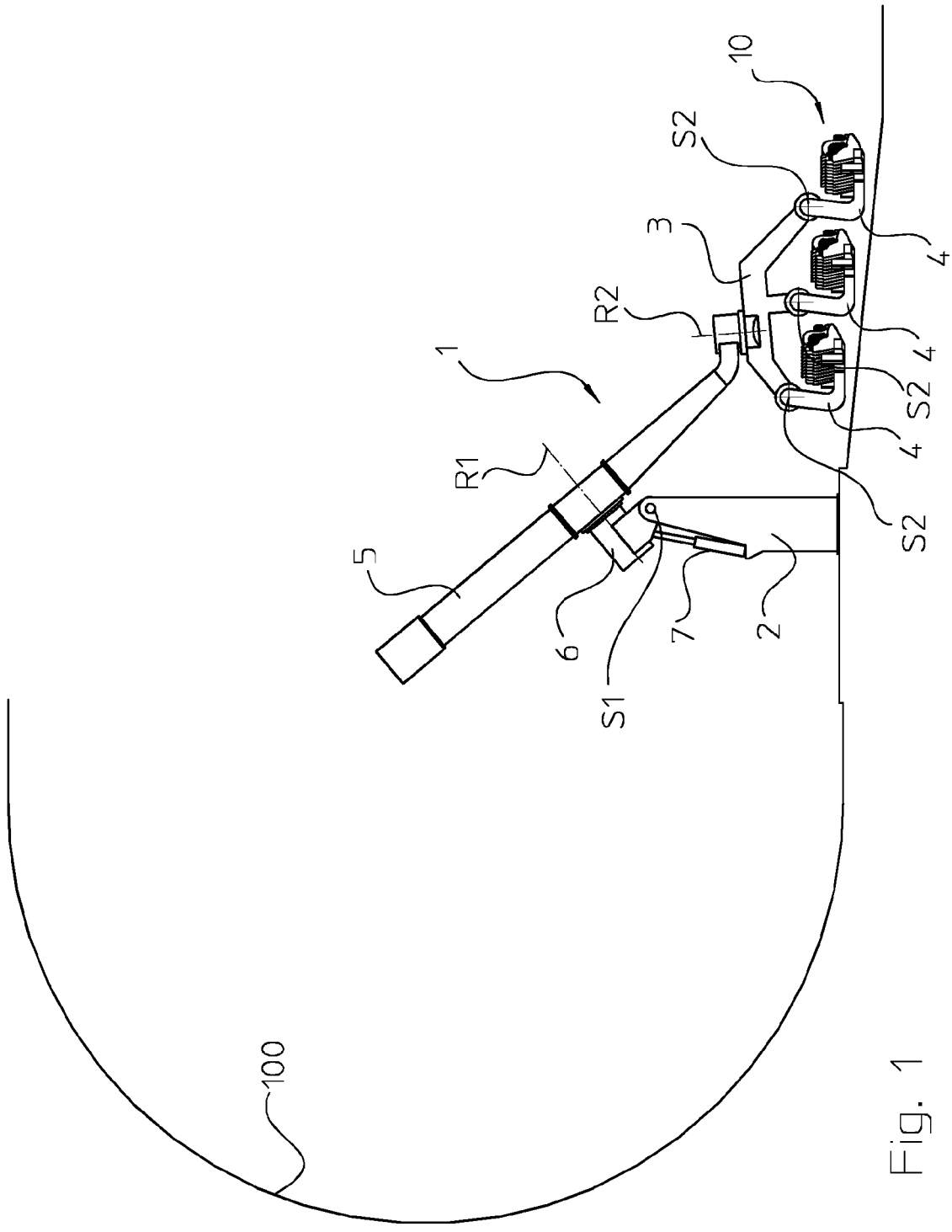

Fig. 1

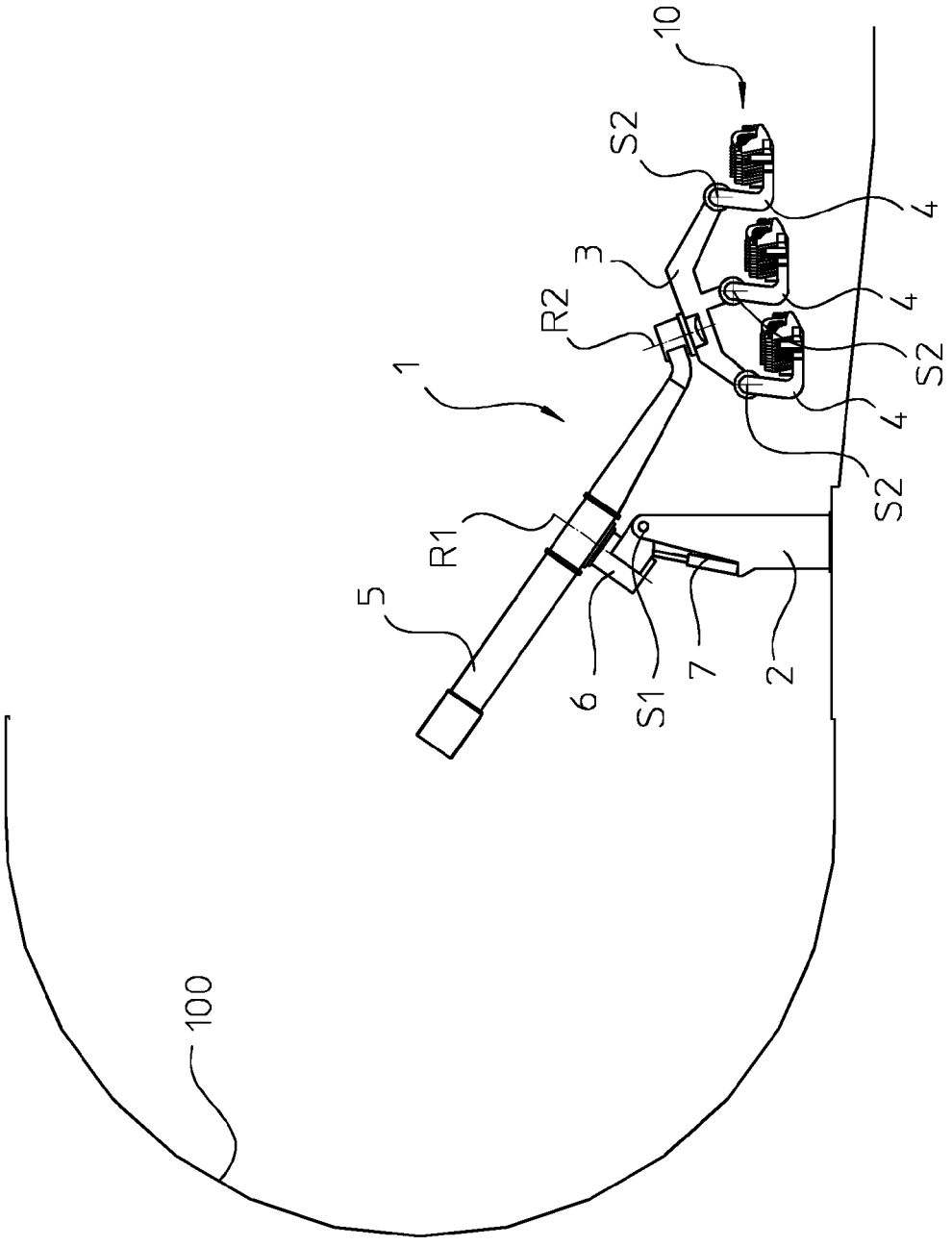

Fig. 2

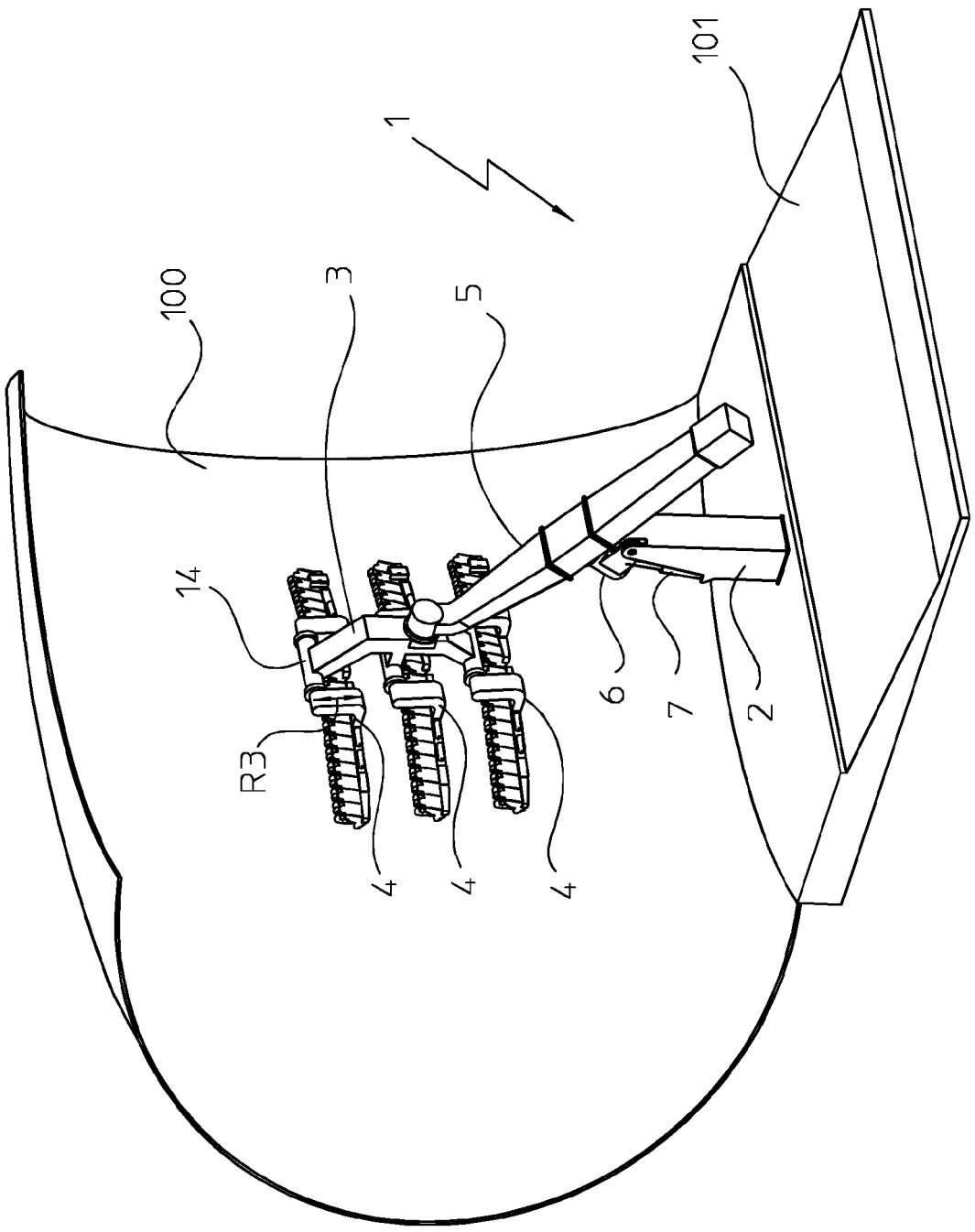

Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 14 17 5263

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	24 October 2014	Lucas, Peter

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 14 17 5263

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82