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Meindl et al.(10) **Pub. No.: US 2007/0113753 A1**(43) **Pub. Date: May 24, 2007**(54) **DRIVE FOR AN AMUSEMENT RIDE**(30) **Foreign Application Priority Data**

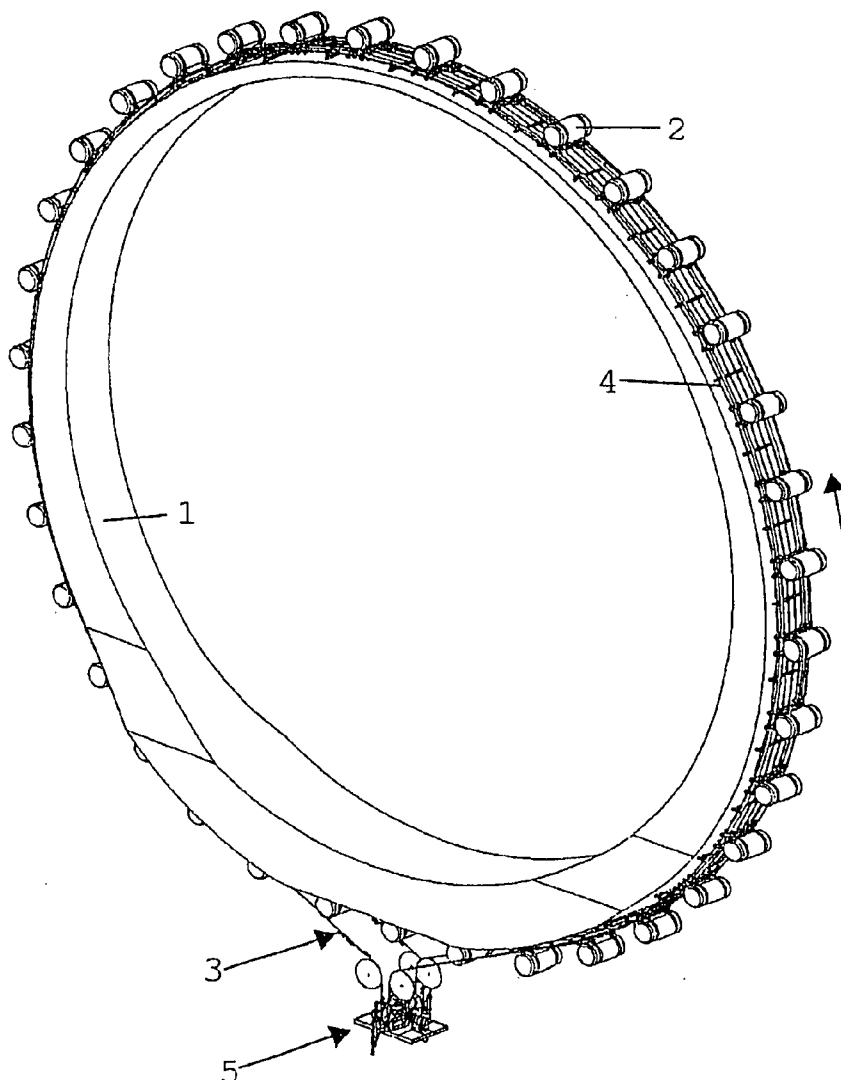
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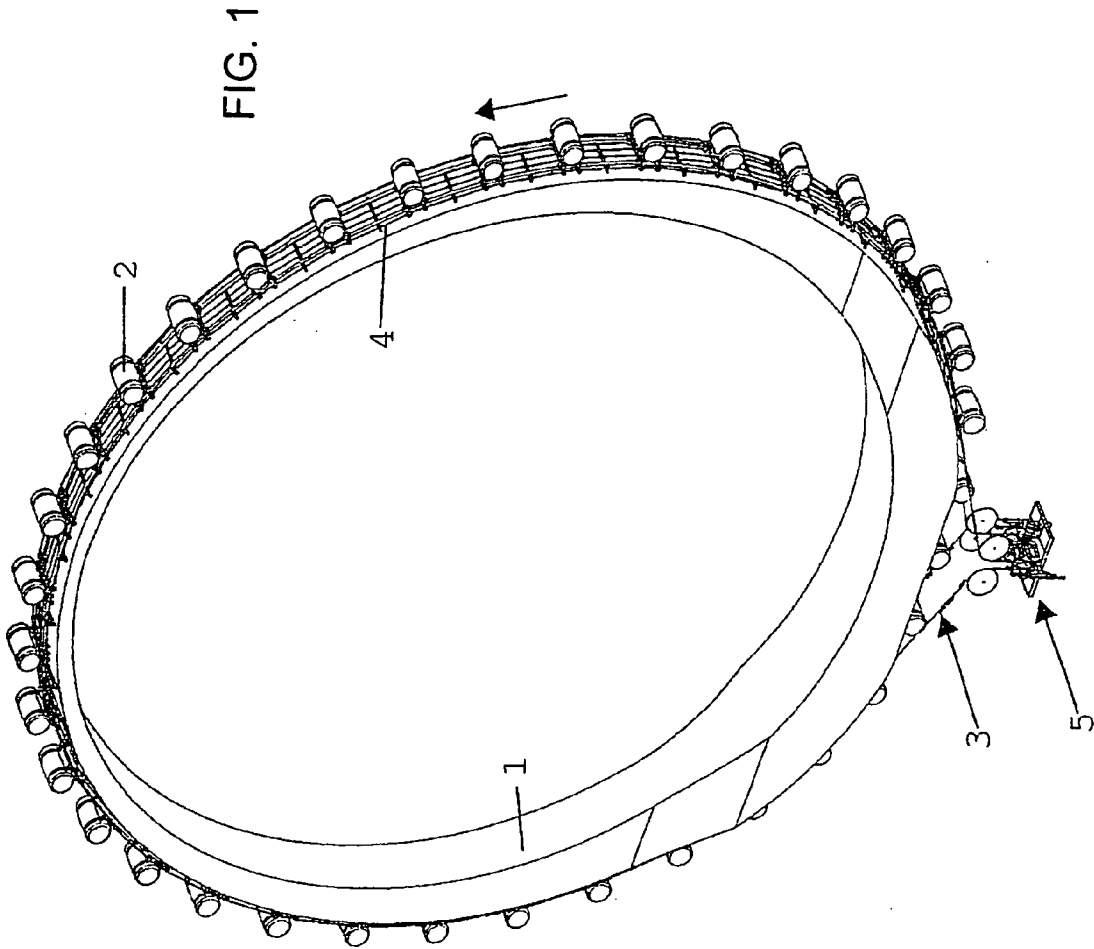
(75) Inventors: **Bernd Meindl**, Hard (AT); **Stephan Lins**, Feldkirch (AT)**Publication Classification**(51) **Int. Cl.****B61B 9/00** (2006.01)(52) **U.S. Cl.** **104/173.1**

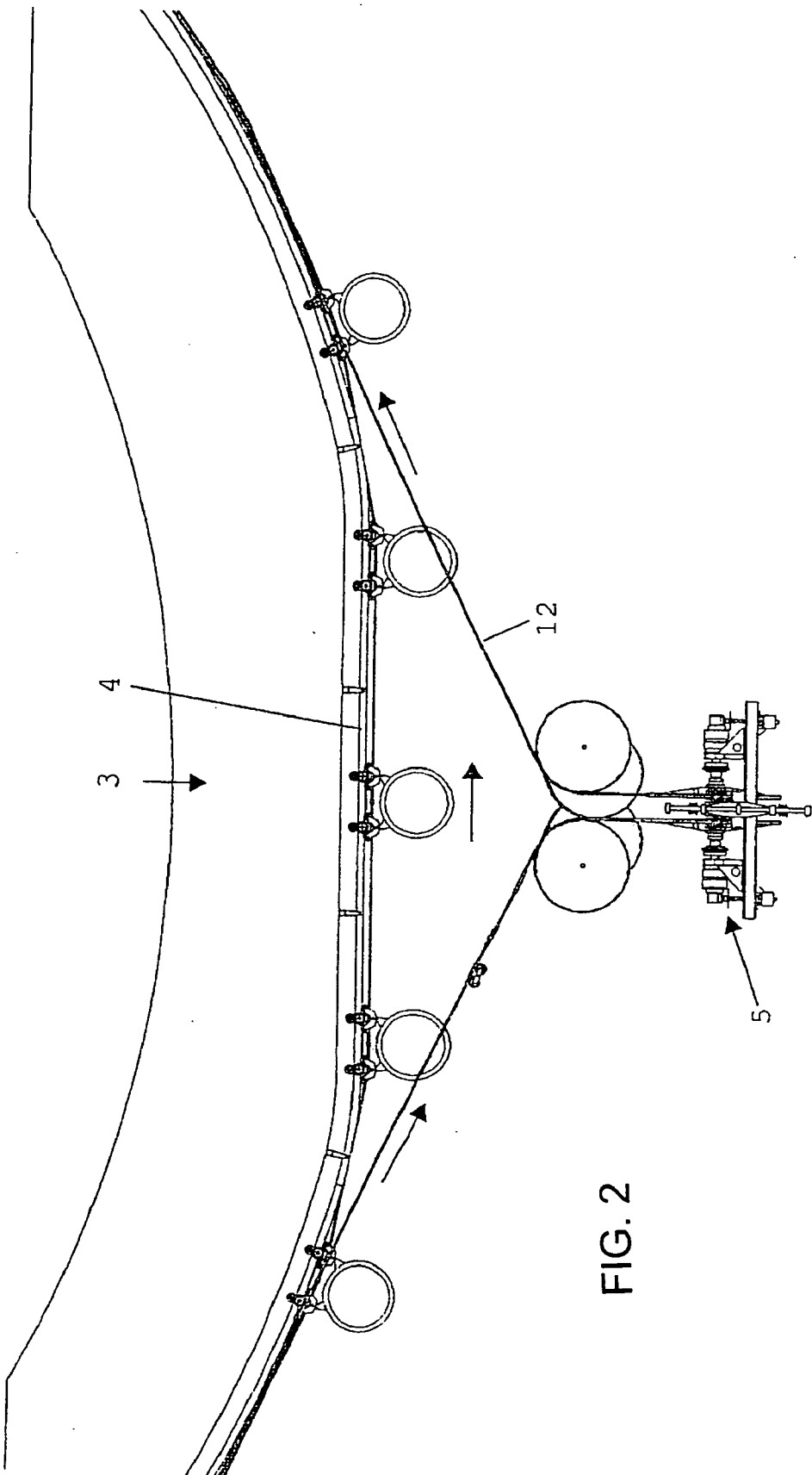
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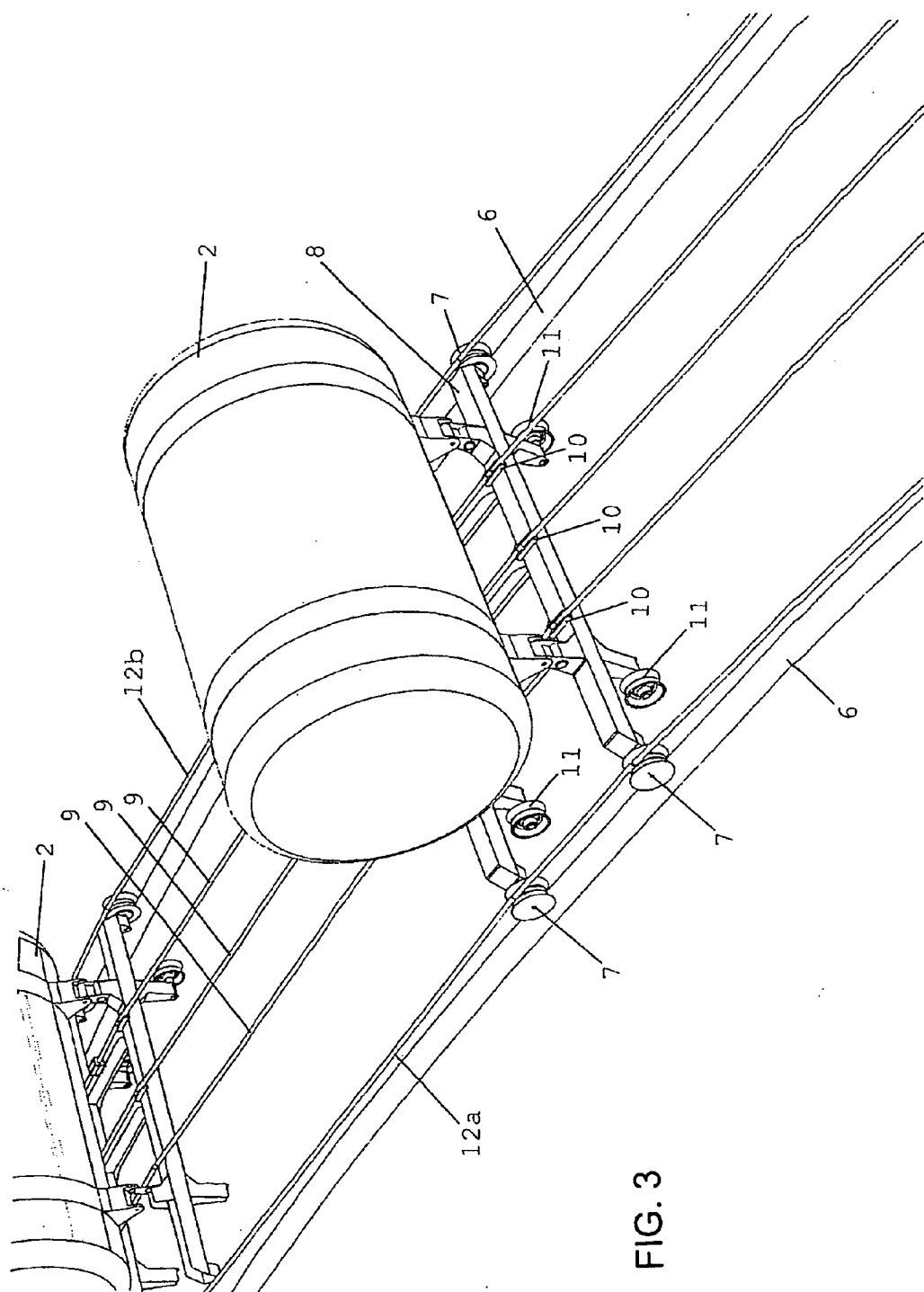
LERNER GREENBERG STEMER LLP
P O BOX 2480
HOLLYWOOD, FL 33022-2480 (US)(57) **ABSTRACT**

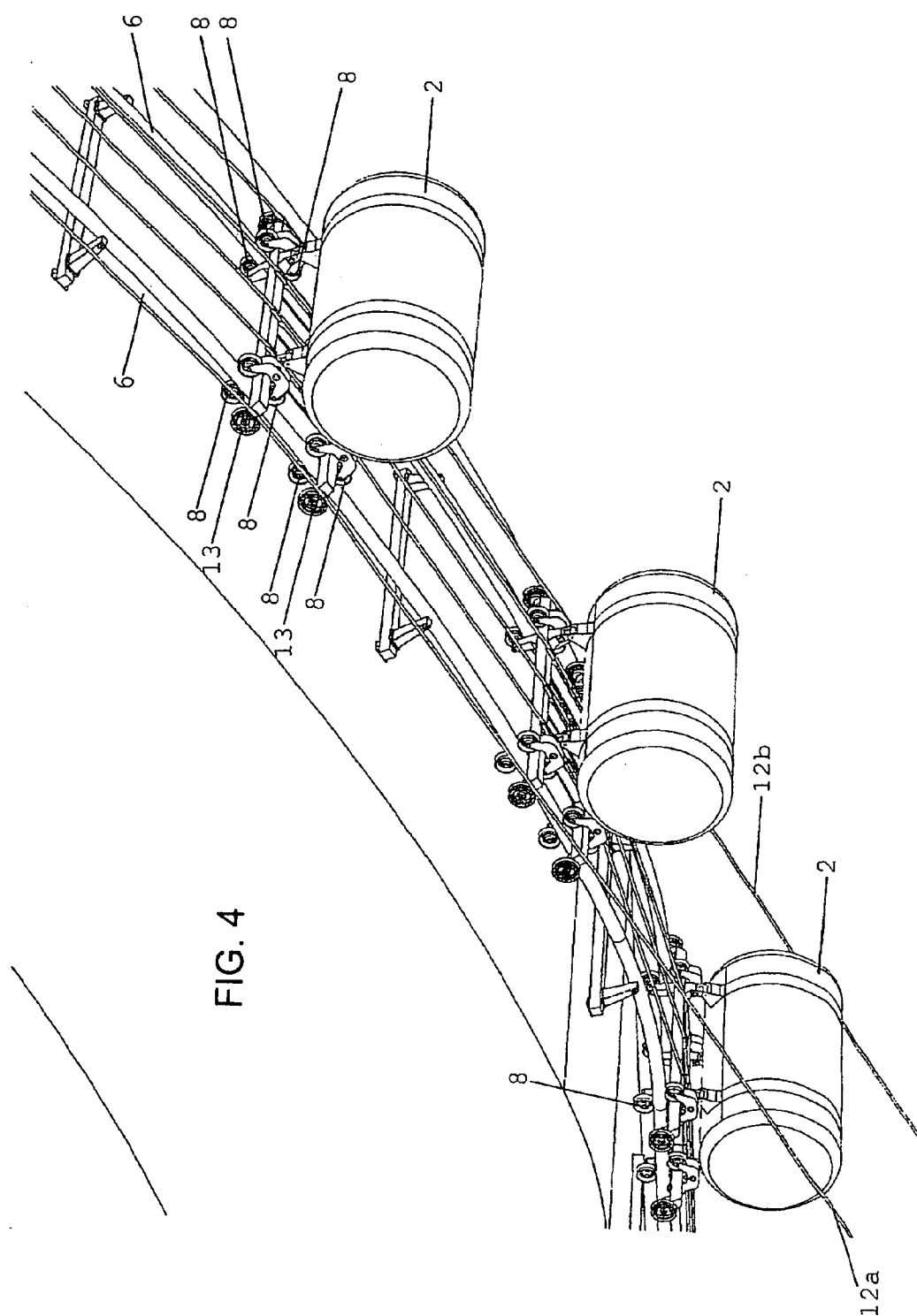
A amusement ride has a positionally fixed supporting structure on which transport devices for persons circulate. A rope drive conveys the transport devices about the supporting structure. The rope drive has one single closed-loop conveying rope which, in being crossed over by way of a deflecting device, forms two rope loops which engage on the transport devices.

(73) Assignee: **Innova Patent GmbH**(21) Appl. No.: **11/603,613**(22) Filed: **Nov. 22, 2006**









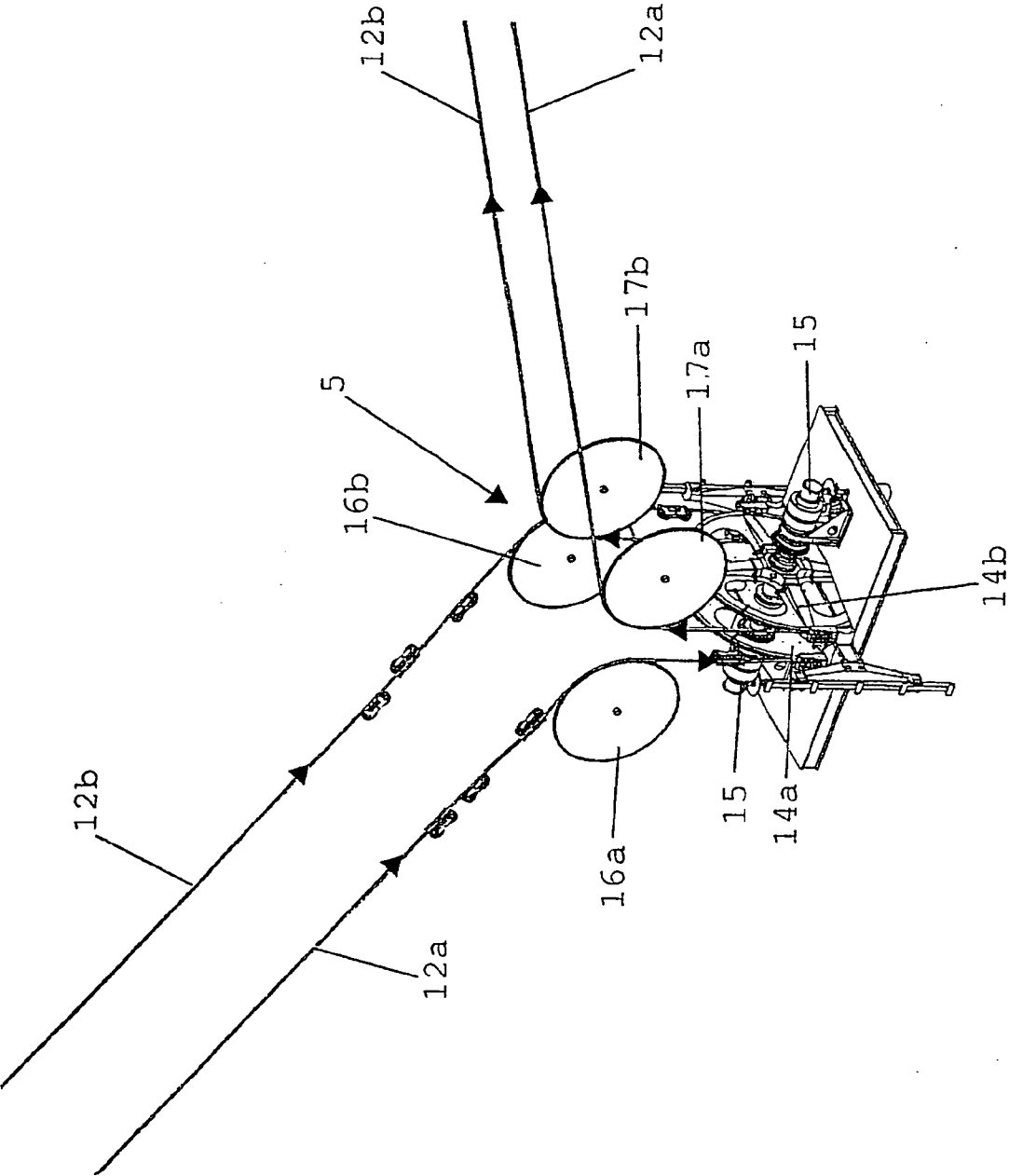


FIG. 5

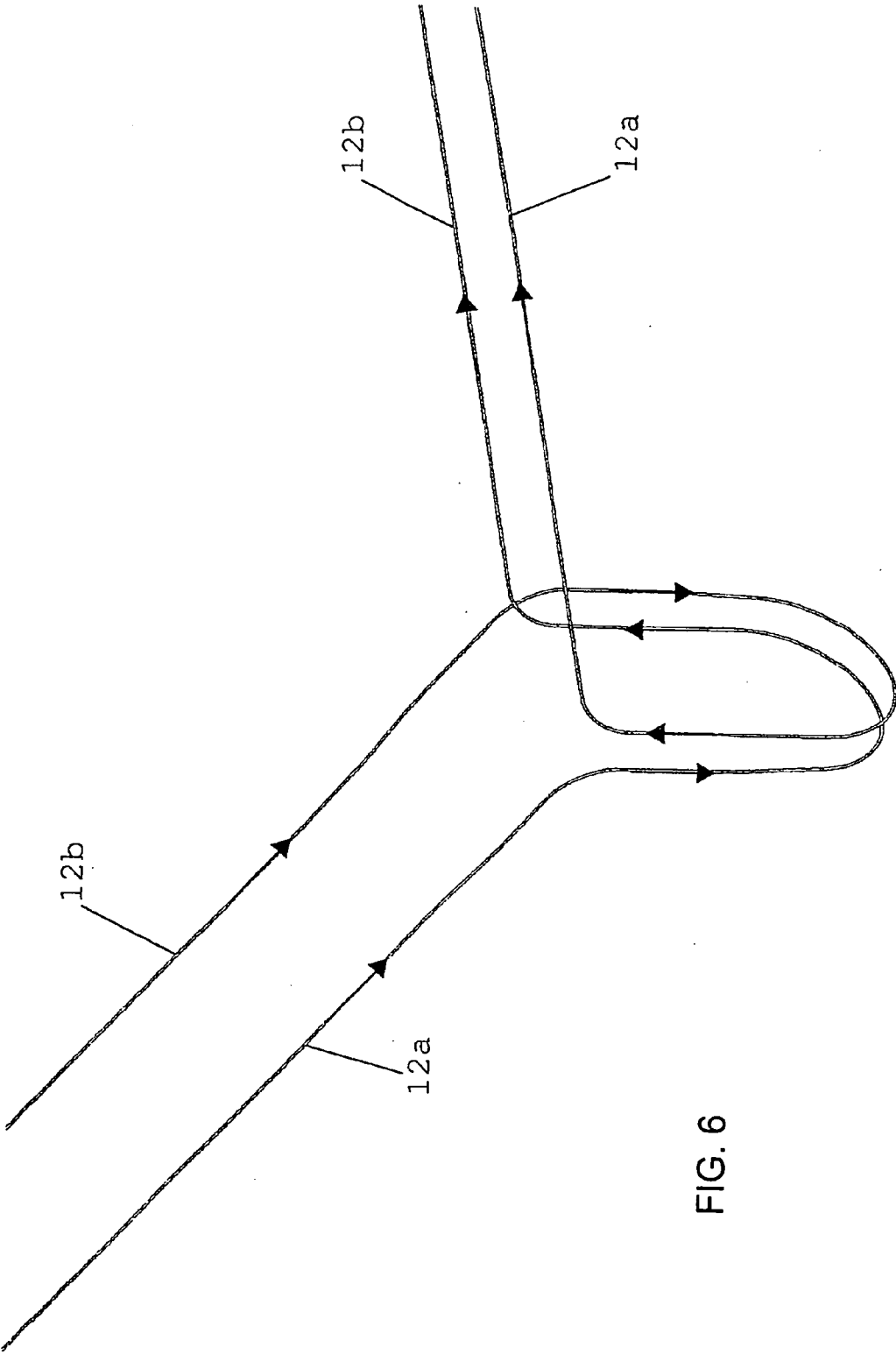


FIG. 6

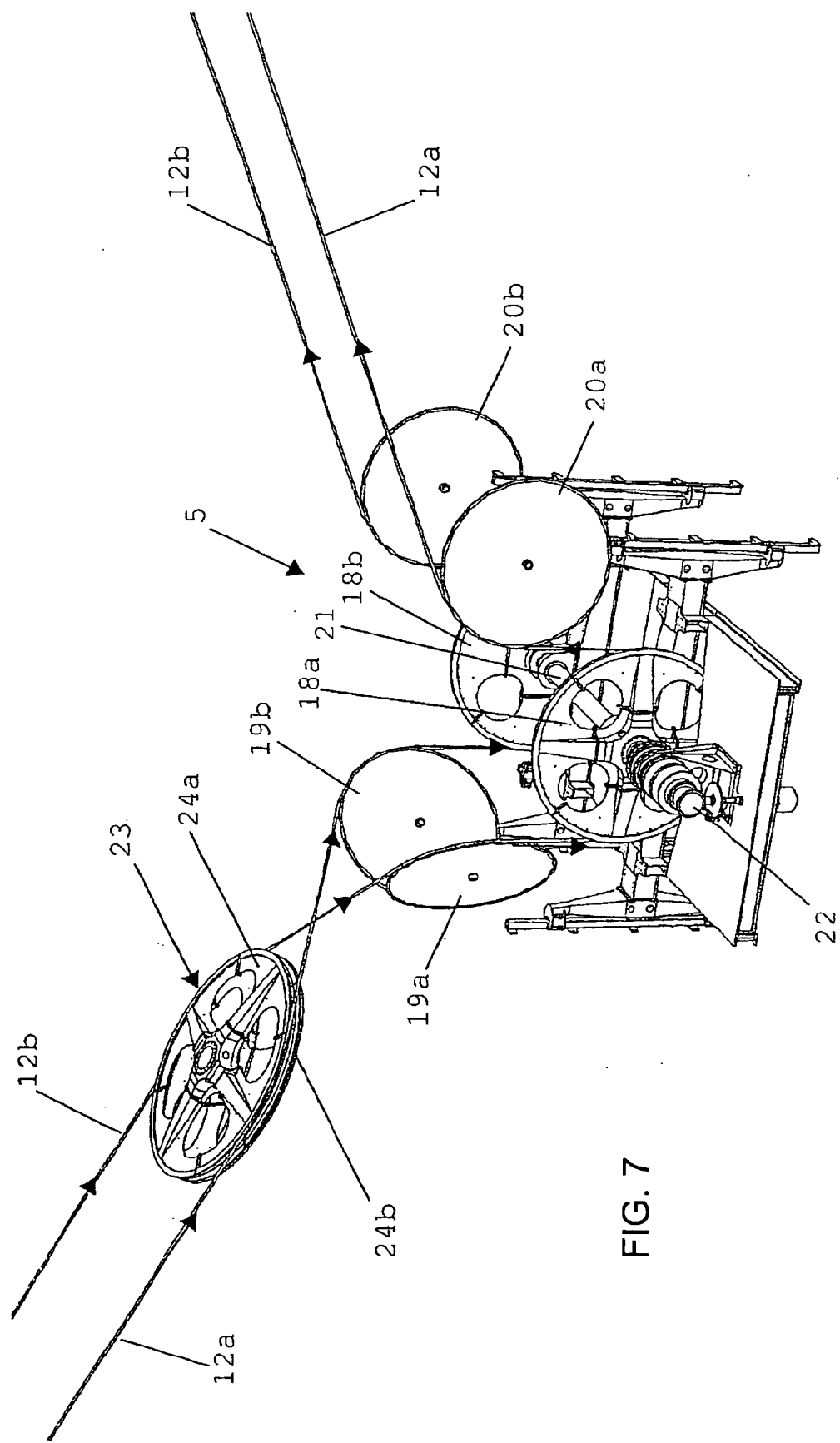
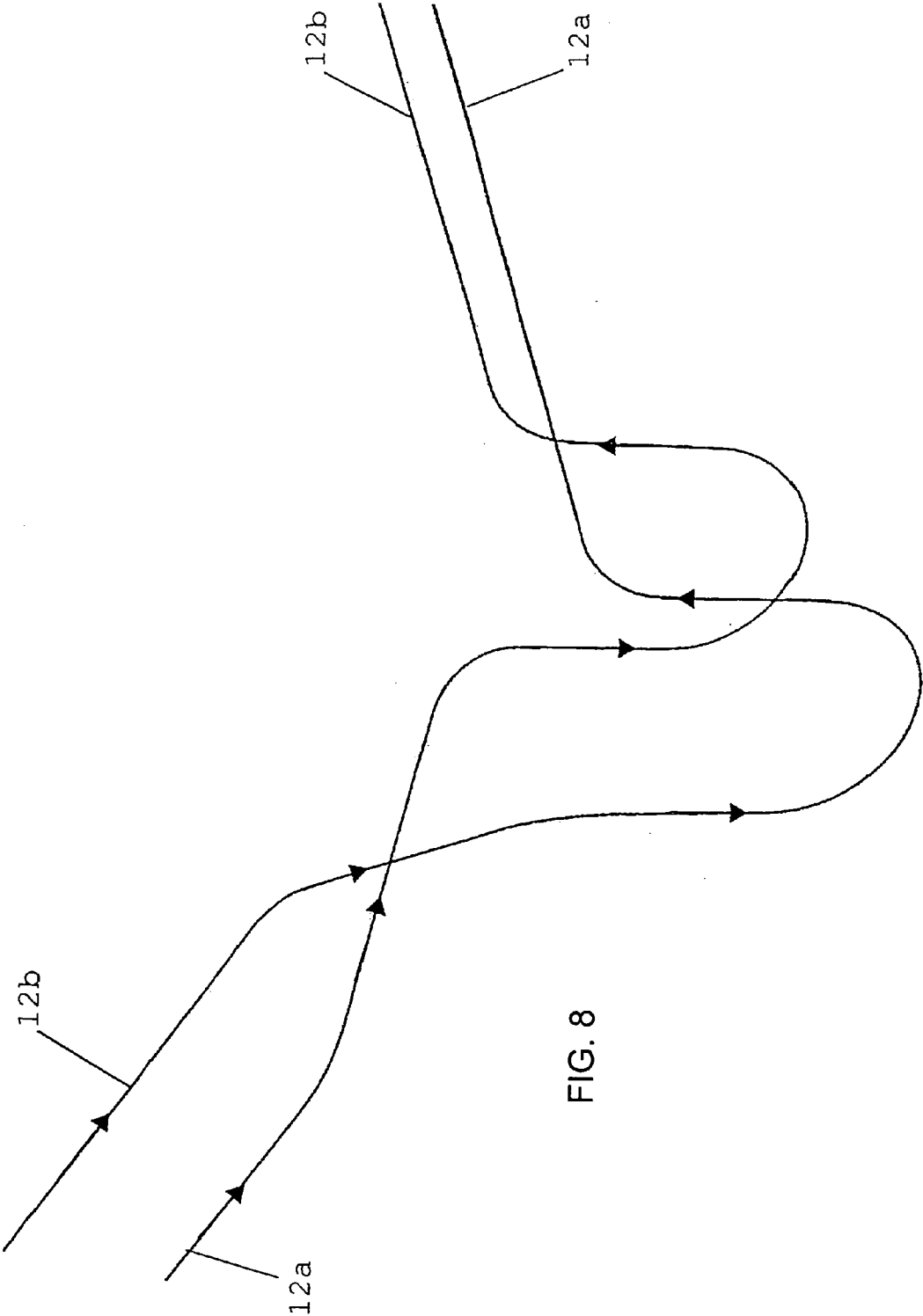


FIG. 7



DRIVE FOR AN AMUSEMENT RIDE**CROSS-REFERENCE TO RELATED APPLICATION**

[0001] This application claims the priority, under 35 U.S.C. § 119, of Austrian application A 1906/2005, filed Nov. 24, 2005; the prior application is herewith incorporated by reference in its entirety.

BACKGROUND OF THE INVENTION**Field of the Invention**

[0002] The invention relates to an amusement ride with a positionally fixed supporting structure on which transport devices for persons circulate. A rope drive is provided for moving the transport devices about the supporting structure.

[0003] An amusement ride of the type is described in European published patent application EP 459 789. There, the transport devices are cabins driven by way of two endless drive ropes which are driven by a motor. The disadvantage of that embodiment is that it is only possible with a very high degree of technical expenditure to ensure that the two separate rope loops run synchronously, since it is not sufficient to run the two drives at the same rotational speed because even small differences in diameter or circumference of the drive disks would lead to different conveying speeds of the two rope loops.

SUMMARY OF THE INVENTION

[0004] It is accordingly an object of the invention to provide an amusement ride and a drive therefor which overcome the above-mentioned disadvantages of the heretofore-known devices and methods of this general type and which ensures that the two rope loops run synchronously.

[0005] With the foregoing and other objects in view there is provided, in accordance with the invention, an amusement ride, comprising:

[0006] a positionally fixed supporting structure;

[0007] transport devices for persons circulating on said supporting structure;

[0008] a rope drive connected to move said transport devices about said supporting structure, said rope drive having a single closed-loop conveying rope; and

[0009] a deflecting device disposed to fold said single closed-loop conveying rope into two rope loops engaging with said transport devices.

[0010] In other words, the objects of the invention are achieved on a generic amusement ride by providing one single closed-loop conveying rope which, in being crossed over by means of a deflecting device, forms two rope loops which each engage on the transport devices, i.e., the transport means.

[0011] Since the invention provides only one single endless rope which is placed around the supporting structure and connected to the transport means in two rope loops, synchronous running of the two rope loops is automatically ensured.

[0012] Two embodiments are preferred for connecting the two rope loops to the transport means.

[0013] One embodiment is characterized in that the conveying rope engages on the transport means by way of a frictionally locking connection, and in that at least one lockable pulley is mounted on the transport means, with the conveying rope bearing on said pulley. In this embodiment, the connection is very simple since it is provided only by the friction caused by the conveying rope bearing firmly against a corresponding contact region of the transport means, in particular against the running gear thereof.

[0014] The other preferred embodiment is characterized in that the conveying rope is connected to the transport means using detachable clamps. This embodiment ensures an even firmer connection between the conveying rope and the transport means, though with a relatively high degree of technical expenditure for the detachable clamps.

[0015] With regard to the deflecting direction and the drive for the rope, there are substantially two preferred variants of the invention.

[0016] The two variants have in common that the deflecting device has two drive disks which are mounted adjacent to one another so as to be coaxial, and in each case one pair of deflecting rollers, which are mounted adjacent to one another, at the run-in side before the deflecting device and at the run-out side after the deflecting device.

[0017] The first variant is characterized in that the drive disks are driven in opposite directions, and in that the deflecting rollers are mounted with their axes parallel to one another.

[0018] The second variant is characterized in that the drive disks are driven in the same direction, in that one pair of the deflecting rollers is mounted with their axes coaxial, in that the other pair of deflecting rollers is mounted with their axes inclined relative to one another, in that a guide device is arranged in the region of said other pair of deflecting rollers, and in that the rope loops cross one another between the guide device and said other pair of deflecting rollers.

[0019] Further preferred embodiments of the invention are the subject matter of the remaining subclaims.

[0020] Further advantages and features of the invention can be gathered from the following description of preferred embodiments of the invention with reference to the appended drawings.

[0021] Other features which are considered as characteristic for the invention are set forth in the appended claims.

[0022] Although the invention is illustrated and described herein as embodied in drive for ferris wheel, it is nevertheless not intended to be limited to the details shown, since various modifications and structural changes may be made therein without departing from the spirit of the invention and within the scope and range of equivalents of the claims.

[0023] The construction and method of operation of the invention, however, together with additional objects and advantages thereof will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] FIG. 1 is a perspective view of an exemplary embodiment of an amusement ride according to the invention;

[0025] FIG. 2 shows, on a larger scale, the entry and exit region of the amusement ride, and the drive disposed below the entry and exit region;

[0026] FIG. 3 shows a first embodiment of the connection of the conveying ropes to the cabins;

[0027] FIG. 4 shows an alternative embodiment of the guidance of the cabins on rails;

[0028] FIG. 5 shows the drive of the amusement ride on a larger scale;

[0029] FIG. 6 is a diagram of the rope guidance system in the region of the drive of FIG. 5;

[0030] FIG. 7 shows an alternative variant of a drive; and

[0031] FIG. 8 is a diagram illustrating the rope guidance system in the region of the drive of FIG. 7.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0032] Referring now to the figures of the drawing in detail and first, particularly, to FIG. 1 thereof, there is shown a perspective view of an amusement ride according to the invention. The device according to the invention will also be referred to as a recreational device. In the exemplary embodiment, the device is illustrated as a "Ferris wheel." The recreational device has a positionally fixed, rigid supporting structure 1 which is embodied, for example, as a rebar reinforced concrete ring, on which transport means 2 in the form of cabins circulate. The outer face 4 of the supporting structure is—with the exception of the entry and exit region 3 situated at the bottom—cylindrical, but may have a shape which deviates from this and be, for example, elliptical. In the entry region 3, the outer face 4 is straight in order to provide a relatively long horizontal entry region (not illustrated in detail) for the passengers. The drive 5 is arranged below the entry region 3 and is in practice arranged in a machine housing so as to be hidden from view.

[0033] Rails 6 are attached to the outer circumferential face 4 of the supporting structure 1, with running rollers 7, which are mounted on a running gear 8 of the cabins 2, rolling on said rails. The individual cabins 2 are connected to one another and held at a defined distance from one another by means of one or more connecting ropes 9, referred to as interconnectors, which are fixedly connected by means of clamps 10 to the running gear 8 of each cabin 2. It is also possible to provide other interconnectors instead of the connecting ropes 9. It is however advantageous to use three connecting ropes 9 because this provides a very stable and secure connection between the cabins 2.

[0034] FIG. 3 also shows a further two pairs of running rollers 11 per running gear 8, said further running rollers 11 serving to support the cabins 2 when the latter are suspended in the entry and exit region 3 below the structure 1.

[0035] Platforms, if appropriate with seats, are arranged in the cabins 2, said platforms being kept horizontal at all times

by means of suitable devices while the cabins rotate as they circulate around the supporting structure 1.

[0036] The cabins 2 are driven by means of one single closed-loop rope 12 which, in two loops 12a and 12b, engages at both sides of the cabins 2 over the running rollers 7 on the running gear 8 of the cabins 2. In this embodiment, the running rollers 7 serve at the same time as friction rollers so that, as a result of the synchronous progressive movement of the two rope loops 12a and 12b, a propulsive force is exerted on the running rollers 7 by means of friction forces, said propulsive force moving the cabins 2 forwards. As a result of the selected form of force transmission, the cabins 2 move at half the speed of the two rope loops 12a and 12b of the conveying rope 12.

[0037] In the embodiment illustrated in FIG. 4, the running rollers 8 are of a different design to those in the embodiment of FIG. 3, specifically in the form of a total of twelve running rollers, four pairs of which are arranged on one side of the rails 6, and the other four individual rollers of which roll on the opposite, inner side of the rails 6. The number of running rollers can vary depending on loading.

[0038] FIG. 4 also illustrates a different form of connection between the rope loops 12a and 12b and the running gear 8. In this embodiment, the rope loops 12a and 12b engage on separate friction wheels 13 which, although being rotatably mounted on the running gear 8, can be locked so that they do not rotate for normal operation. The cabins are conveyed at the same speed as the rope loops 12a and 12b as a result of the friction between the rope 12 and the friction wheels 13. The function of the rotatable mounting of the friction wheels 13 will be explained further below.

[0039] Two drive disks 14, which are driven by motors 15, are provided in the region of the drive 5, as can be seen in detail in a first embodiment of the invention in FIG. 5. The drives rotate at the same speed in opposite directions. Synchronous running of the two drive disks 14a, 14b is obtained either by control-related means or by mechanically coupling the two drives. Above the drive disks 14a, 14b, two pairs of deflecting rollers 16a, 16b and 17a, 17b are provided, the rotational axes of which are arranged offset relative to one another. Said offset arrangement of the deflecting rollers makes it possible for the two rope loops 12a and 12b to cross in the region of the drive 5. In physical terms, the rope of the rope loop 12a which runs in from the left in FIG. 5 runs over the deflecting roller 16a and the drive disk 14a, is then guided over the deflecting roller 17b, and runs out of the drive 5 in the rope loop 12b. In contrast, the rope of the rope loop 12b which runs in from the left is guided over the deflecting roller 16b to the drive disk 14b, and runs over the deflecting roller 17a and out of the drive unit 5 in the rope loop 12a. In other words, the rope 12 is switched from the rope loop 12a through the drive unit 5 to the rope loop 12b, and from the rope loop 12b to the rope loop 12a.

[0040] Absolutely synchronous running of the two rope loops 12a and 12b is ensured as a result of the two rope loops 12a, 12b being formed by one single closed-loop rope, so that it is ensured that the cabins 2 run without tilting, which not only minimizes the expenditure in mounting the running gear 8 on the rails 6 of the supporting structure 1, but also keeps the wear of the running gear and of the rails as low as possible.

[0041] After assembly of the recreational device according to the invention, the drive 5 must initially be run-in. This is necessary since it is not possible for the two drive disks 14a and 14b to be produced with such a degree of accuracy that they have exactly the same diameter and circumference, which is required since only one single encircling rope is used, and the two rope loops 12a, 12b must therefore be driven at the same speed.

[0042] The running-in process eliminates geometric differences between the two drive disks 14a and 14b, primarily as a result of mechanical abrasion on the drive disks 14a and/or 14b. It is however advantageous if the cabins 2 do not have to be driven during said running-in process. It is for this reason that the friction rollers 13 in the embodiment of FIG. 4 are initially freely rotatable, so that the conveying rope 12 can roll on them without moving the cabins 2. The friction rollers 13 are only locked once the running-in process is complete, so that the cabins 2 move at the same speed as the rope 12 as a result of the frictionally locking connection between the rope 12 and the friction rollers 13.

[0043] As can be seen from the drawings, the rope 12 bears against the running rollers 7 and friction rollers 13 from the outside so that, in addition to the taut connecting ropes 9, the taut rope 12 also presses the running gears 8 of the cabins 2 firmly against the rails 6. At the start of the entry and exit region 3, however, the rope 12 moves away from the running rollers 7 and the friction rollers 13 since the rope 12 is conveyed directly to the deflecting rollers 16a, 16b, whereas the guide track 4 with the rails 6 continues horizontally. Until contact is regained between the rope 12 and the running rollers 7 and friction rollers 13 at the end of the entry and exit region 3, the cabins 2 are driven by means of the connecting ropes 9, by means of which the running gears 8 of the cabins 2 remain held pressed against the rails 6. As mentioned, the running rollers 11 (FIG. 3) or the radially inwardly situated running roller pairs 8 (FIG. 4) are additionally provided, said running rollers 11 or running roller pairs 8 preventing the suspended gondolas 2 from lifting off the rails 6.

[0044] Instead of a frictionally locking connection between the rope 12 and the running gear 8 in the form of friction rollers 13 (FIG. 4) or running rollers (FIG. 3), it is fundamentally also possible to provide other forms of connection between the rope 12 and the running gears 8. For example, detachable coupling elements could be provided on the running gears, by means of which detachable coupling elements the cabins 2 are decoupled from the rope 12 at the start of the entry and exit region 3, and are coupled on again at the end of said region.

[0045] FIGS. 7 and 8 illustrate an alternative embodiment of a drive 5. Two drive disks 18a and 18b are again provided, though in this embodiment said drive disks 18a and 18b rotate in the same direction and are rigidly connected to one another by means of a shaft 21. The drive disks 18a and 18b are driven by one or two motors 22, it being preferable to use two motors 22 since, if one motor fails, the operation of the recreational device can continue, if appropriate with reduced power, by decoupling the failed motor from the shaft 21.

[0046] In the embodiment illustrated in FIGS. 7 and 8, two coaxially arranged deflecting rollers 20a and 20b are provided at the run-out side, and two deflecting rollers 19a and 19b, which are arranged adjacent to one another but with

their rotational axes inclined relative to one another, are provided at the run-in side. In addition, a guide device 23 is arranged at the run-in side before the two deflecting rollers 19a and 19b, said guide device 23 having two pulleys 24a and 24b which are mounted coaxially and rotate counter to one another. Here, the two rope loops 12a and 12b cross in the region between the guide device 23 and the two deflecting rollers 19a and 19b. In physical terms, the rope of the rope loop 12a which runs in from the left in FIGS. 7 and 8 runs over the upper pulley 24a of the guide device 23 to the deflecting roller 19b and over the drive disk 18b, is then guided over the deflecting roller 20b and runs out of the drive 5 in the rope loop 12b. In contrast, the rope of the rope loop 12b which runs in from the left is guided through over the lower pulley 24b of the guide device 23 and below the rope of the rope loop 12a, and runs over the deflecting-roller 19a, the drive disk 18a and the deflecting roller 20a and out of the drive unit 5 in the rope loop 12a.

[0047] Although the embodiment of the drive according to FIGS. 7 and 8 requires an additional guide device 23 in comparison to the embodiment of the drive according to FIGS. 5 and 6, the former embodiment has the mentioned advantages regarding the synchronous drive of the two drive disks 18a and 18b by means of the mechanical coupling provided by the shaft 21.

We claim:

1. An amusement ride, comprising:

a positionally fixed supporting structure;

transport devices for persons circulating on said supporting structure;

a rope drive connected to move said transport devices about said supporting structure, said rope drive having a single closed-loop conveying rope; and

a deflecting device disposed to fold said single closed-loop conveying rope into two rope loops engaging with said transport devices.

2. The amusement ride according to claim 1, wherein said transport devices are connected with said conveying rope by way of a frictionally locking connection.

3. The amusement ride according to claim 2, which comprises at least one lockable pulley mounted on each of said transport devices, with said conveying rope bearing on said pulley.

4. The amusement ride according to claim 2, wherein said conveying rope is connected to said transport device with detachable clamps.

5. The amusement ride according to claim 1, which comprises interconnectors connecting said transport devices to one another with a fixed spacing.

6. The amusement ride according to claim 5, wherein said interconnectors are formed by at least one rope that is fixedly connected to respective said transport devices.

7. The amusement ride according to claim 1, wherein said supporting structure is formed with rails and said transport devices carry running rollers for running on said rails.

8. The amusement ride according to claim 7, wherein said transport devices are connected with said conveying rope by way of a frictionally locking connection, and said conveying rope is disposed to bear on and drive said running rollers.

9. The amusement ride according to claim 1, wherein said deflecting device has two drive disks mounted coaxially and adjacent one another, and one pair each of deflecting rollers mounted adjacent one another at a run-in side before said drive disks and at a run-out side following said drive disks.

10. The amusement ride according to claim 9, wherein said drive disks are driven in mutually opposite directions, and said deflecting rollers are mounted with axes thereof parallel to one another.

11. The amusement ride according to claim 9, wherein said drive disks are commonly driven in a given direction, a first pair of said deflecting rollers is mounted coaxially, and a second pair of deflecting rollers is mounted with axes

thereof inclined relative to one another, and said guide device is disposed in a region of said second pair of deflecting rollers, and said rope loops cross one another between said guide device and said second pair of deflecting rollers.

12. The amusement ride according to claim 11, wherein said guide device is disposed before said second pair of deflecting rollers in a direction of motion of said rope.

13. The amusement ride according to claim 11, wherein said guide device has two coaxially mounted pulleys.

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