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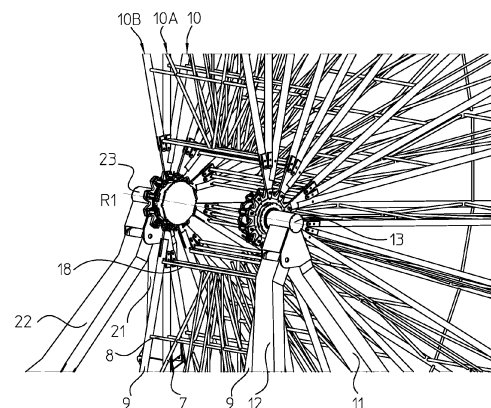
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(54) **IMPROVED MOBILE FERRIS WHEEL AND METHOD FOR BUILDING THE FERRIS WHEEL**

(57) The present invention relates to a Ferris wheel, comprising two pairs of masts (11, 12, 21, 22), wherein the masts in each pair are hingedly connected to each other and wherein each pair of masts is moveable between a folded position and a stretched position. The Ferris wheel is provided with multiple spokes (10), two spoke rings for mounting the spokes and multiple ring segments for interconnection of the spokes. The Ferris wheel comprises a first shaft (13), which is mounted fixedly on the top of the first pair of masts (11, 12), wherein a first of the two spoke rings is arranged rotatably around the first shaft. The Ferris wheel further comprises a second shaft (23), which is mounted fixedly on the top of the second pair of masts (21, 22), wherein the second spoke ring is arranged rotatably around the second shaft. In use of the Ferris wheel, the second shaft is substantially in line with the first shaft at a distance from the first shaft.

The invention also relates to a method for building the Ferris wheel according to the invention.



FIGUUR 2

## Description

**[0001]** The present invention relates to a Ferris wheel, comprising two pairs of masts, wherein the masts in each pair are hingedly connected to each other and wherein each pair of masts is moveable between a folded position and a stretched position, wherein the Ferris wheel is further provided with multiple spokes, two spoke rings for mounting the spokes and multiple ring segments for interconnection of the spokes.

**[0002]** Such a mobile Ferris wheel is known in the relevant technical field. The European patent EP2055362 of the same applicant for example describes a support structure for a mobile Ferris wheel. The known mobile Ferris wheel is intended as moveable (fairground) attraction and can be build up and broken down in a quick and safe manner.

**[0003]** The present invention aims to provide an improved mobile Ferris wheel, which can be build up and broken down even quicker and safer.

**[0004]** The Ferris wheel according to the present invention is thereto characterized in that the Ferris wheel comprises a first shaft, which is mounted fixedly on the top of the first pair of masts, wherein a first of the two spoke rings is arranged rotatably around the first shaft, that the Ferris wheel further comprises a second shaft, which is mounted fixedly on the top of the second pair of masts, wherein a second of the two spoke rings is arranged rotatably around the second shaft, wherein, in use of the Ferris wheel, the second shaft is substantially in line with the first shaft at a distance from the first shaft.

**[0005]** The Ferris wheel according to the invention has to its advantage that it does not comprise a main shaft anymore. Consequently, the usage of a crane when building up and breaking down the Ferris wheel is no longer needed. The known Ferris wheels with main shafts need a crane during build up for placing the main shaft on the masts and during break down for removing the main shaft from the masts. A crane takes up a lot of space and when driving it onto the site one often has to wait for this space to be available. The build up and break down of the Ferris wheel according to the invention therefore cost less time and are cheaper. It is also safer, because a heavy main shaft no longer has to be lifted onto the masts. Furthermore, a main shaft is usually custom made in a separate production step, which can now be omitted. The production of the Ferris wheel according to the invention is therefore cheaper than that of a Ferris wheel with main shaft.

**[0006]** In a first preferred embodiment each spoke has two legs that run substantially parallel that are connected to each other by means of a number of rods, wherein a first mounting element on an end of a first leg is arranged for mounting in the first spoke ring and a second mounting element on an end of a second leg is arranged for mounting in the second spoke ring, wherein the spoke is provided with a first crossbar that connects the legs near the ends. The usage of these double spokes contributes to

the stiffness of the Ferris wheel according to the invention. Moreover, the building and breaking down happens quicker when using double spokes.

**[0007]** In an elegant preferred embodiment the spoke rings are mounted on ends of the first and second shaft that are facing each other. The first shaft and second shaft can then be made as short as possible. The weight and costs of short shafts are lower. A stub axle is for example very suitable as an application for both the first shaft and the second shaft.

**[0008]** The present invention also relates to a method for building the Ferris wheel according to one of the preceding claims, wherein the method comprises the following steps

- a) jointly raising the first pair of masts with the first shaft to the stretched position;
- b) jointly raising the second pair of masts with the second shaft to the stretched position;
- c) outlining the first and second shaft on a common axis of rotation;
- d) mounting the spokes in the first spoke ring and in the second spoke ring; and
- e) connecting the spokes with the ring segments.

**[0009]** The invention will now be described in more detail with reference to the figures.

Figure 1 shows a schematic view of a Ferris wheel according to the invention in a position of use;

Figure 2 schematically shows a part of the Ferris wheel according to the invention of figure 1 in more detail; and

Figure 3 schematically shows a part of the Ferris wheel according to the invention of figure 2 in more detail.

**[0010]** Figure 1 shows a schematic view of a preferred embodiment of a Ferris wheel 1 according to the invention in a position of use. The Ferris wheel 1 is moveable and is suitable as fairground attraction.

**[0011]** The Ferris wheel 1 is provided with a base 2, which can for example comprise a number of semi-trailers. The Ferris wheel 1 further comprises a first pair of masts 11, 12 and a second pair of masts 21, 22. Each pair of masts is moveable between the shown stretched position and a folded position.

**[0012]** Figure 2 schematically shows a part of the Ferris wheel according to the invention of figure 1 in more detail.

In the shown preferred embodiment, the masts in each pair are hingedly coupled on the top by means of a hinge S1. Each mast 11, 12, 21, 22 is hingedly mountable on the base 2. In each pair, the masts comprise a number of hingeable segments. The main masts 11, 21 each have two hingeable segments in the shown preferred embodiment and the auxiliary masts 12, 22 each have three hingeable segments. For stretching and folding the masts, suitable actuators are provided. In the shown pre-

ferred embodiment, the actuators are hydraulic cylinders 17, which support on the base 2 and against the main shaft 11, 21 in each pair. The aforementioned European patent EP2055362 of the same applicant describes an example of a suitable, foldable support structure for a Ferris wheel.

**[0013]** The Ferris wheel is, as usual, made up of a number of spokes 10, which are at their distal ends connected to each other by ring segments 3, which together form an outer ring of the Ferris wheel on which gondolas (not shown) can be hung. The spokes 10 are connected at multiple positions along their length by means of further ring segments 4 and 5, which form further inner rings. In the shown preferred embodiment a drive 6 is provided, which drives the outer ring of the Ferris wheel 1. Such a drive is known in the relevant technological field.

**[0014]** For the transport of the remaining parts of the attraction, in this example the spokes 10 and the ring segments 3, 4, 5, for example further semi-trailers are provided.

**[0015]** Figure 3 schematically shows a part of the Ferris wheel according to the invention of figure 2 in more detail.

**[0016]** According to the invention, the Ferris wheel 1 comprises two separate shafts 13, 23 that are in line on a rotation axis R1. The first shaft 13 is mounted fixedly on the top of the first pair of masts 11, 12. A first spoke ring or spoke wheel 14 is arranged rotatably around the first shaft 13 by means of a first bearing (not shown). The second shaft 23 is mounted fixedly to the top of the second pair of masts 21, 22. A second spoke ring or spoke wheel 24 is arranged rotatably around the second shaft 23 by means of a second bearing (not shown).

**[0017]** The first spoke ring 14 and the second spoke ring 24 are provided on the periphery thereof with first mounting openings 15 respectively second mounting openings 25 for mounting the spokes 10 at the location of the proximal ends thereof. After mounting, the spokes 10 extend radially from the rotation axis R1. In the shown preferred embodiment, each spoke 10 has two legs 9 that run substantially parallel, which are connected to each other by means of a number of rods 7, 8. Each spoke 10 has a first mounting element on an end of a first leg 9, which is arranged for mounting in one of the first mounting openings 15 in the first spoke ring 14. Each spoke 10 has a second mounting element on an end of a second leg 9, which is arranged for mounting in one of the second mounting openings 25 in the second spoke ring 24. Each spoke is further provided with a first cross-bar 18 that connects the legs 9 near the ends and the mounting elements.

**[0018]** Preferably, the spokes are grouped in sets of two or three. In each set there is a main spoke 10. On the main spoke 10, one or two further spokes are mounted, for example in a hingeable manner. In the shown preferred embodiment, the spokes are grouped in sets of three with further spokes 10A and 10B which are substantially identical to the spokes 10. Each set of spokes has joint first and second mounting elements, which are

mounted on the main spoke 10.

**[0019]** The first spoke ring 14 is located near an end of the first shaft 13 and the second spoke ring 24 is located near an end of the second shaft 23. The first shaft 13 and the second shaft 23 function as stub axle. The spoke rings 14, 24 should be directed towards each other. In use of the Ferris wheel, the distance between the spoke rings 14, 24 should substantially correspond to the distance between the double legs 9 of the spokes 10.

**[0020]** The first shaft 13 and second shaft 23 are either fixed or rigidly mounted on the respective pair of masts, for example by means of a weld joint or by fixation with multiple pins.

**[0021]** Optionally, the spoke rings 14, 24 are, on the sides that face each other, each provided with a housing 16 respectively 26 for electricity, for example lighting.

**[0022]** The method for building the Ferris wheel according to the invention comprises the following steps.

**[0023]** In a first step the first pair of masts 11, 12 with the first shaft 13 is raised with the help of suitable operating means (not shown) for the actuators 17.

**[0024]** In a second step the second pair of masts 21, 22 with the second shaft 23 is raised with the help of suitable operating means for the actuators 17. The first and second step can also be carried out in reverse order or simultaneously.

**[0025]** In a third step the first and second shaft 13, 23 are aligned on a joint rotation axis R1. The base 2 can hereto be a platform that is equipped with a support system for moving the platform, as described in the European patent EP3323479 of the same applicant. The known support system can be used to tilt the platform in order to align the first and second shaft 13, 23 and/or to set the desired distance between the first and second shaft. Optionally, self-aligning bearings can be used for the spoke rings to tilt the spoke rings. Various other aligning means can be used for this, among which aligning means that use light.

**[0026]** In a fourth step the spokes 10 are plugged into the first spoke ring 14 and in the second spoke ring 24. The spokes 10 are hereto raised with winches. Preferably two winches are used for this, which are mounted on the spokes. The first respectively second mounting elements are preferably arranged as seekers and the first respectively second mounting openings are preferably arranged as search holes for cooperation with the seekers.

**[0027]** In a fifth step the spokes 10 are connected with the ring segments. In the shown preferred embodiment, a double outer ring is formed with the ring segments 3. A double inner ring is formed with the ring segments 5 and with the ring segments 4 an intermediate double ring is formed.

**[0028]** In subsequent steps the Ferris wheel is further build up in the usual way and, for example, gondolas (not shown) are hung on the outer rings.

**[0029]** When breaking down the Ferris wheel, after removing the gondolas, ring segments and spokes, the first pair of masts 11, 12 with the first stub axle 13 and the

second pair of masts 21, 22 with the second stub axle 23 can be lowered down to the folded position. This can be carried out with the help of the same operating means as used for the actuators 17.

**[0030]** The inventive idea is based on the insight that the Ferris wheel does not have a main shaft, but two aligned, separate shafts. Each pair of masts is connected to each other at the top and supports one of the two shafts at the location of that connection. Each pair of masts with shaft can move independently between the folded and the stretched position.

**[0031]** It generally applies that suitable hinges, operating means and mounting means are in itself known in the relevant technical field.

**[0032]** The invention is therefore not limited to the described and shown preferred embodiment, but extends to any embodiment that falls within the scope of protection, as defined in the claims and seen in the light of the preceding description and accompanying figures.

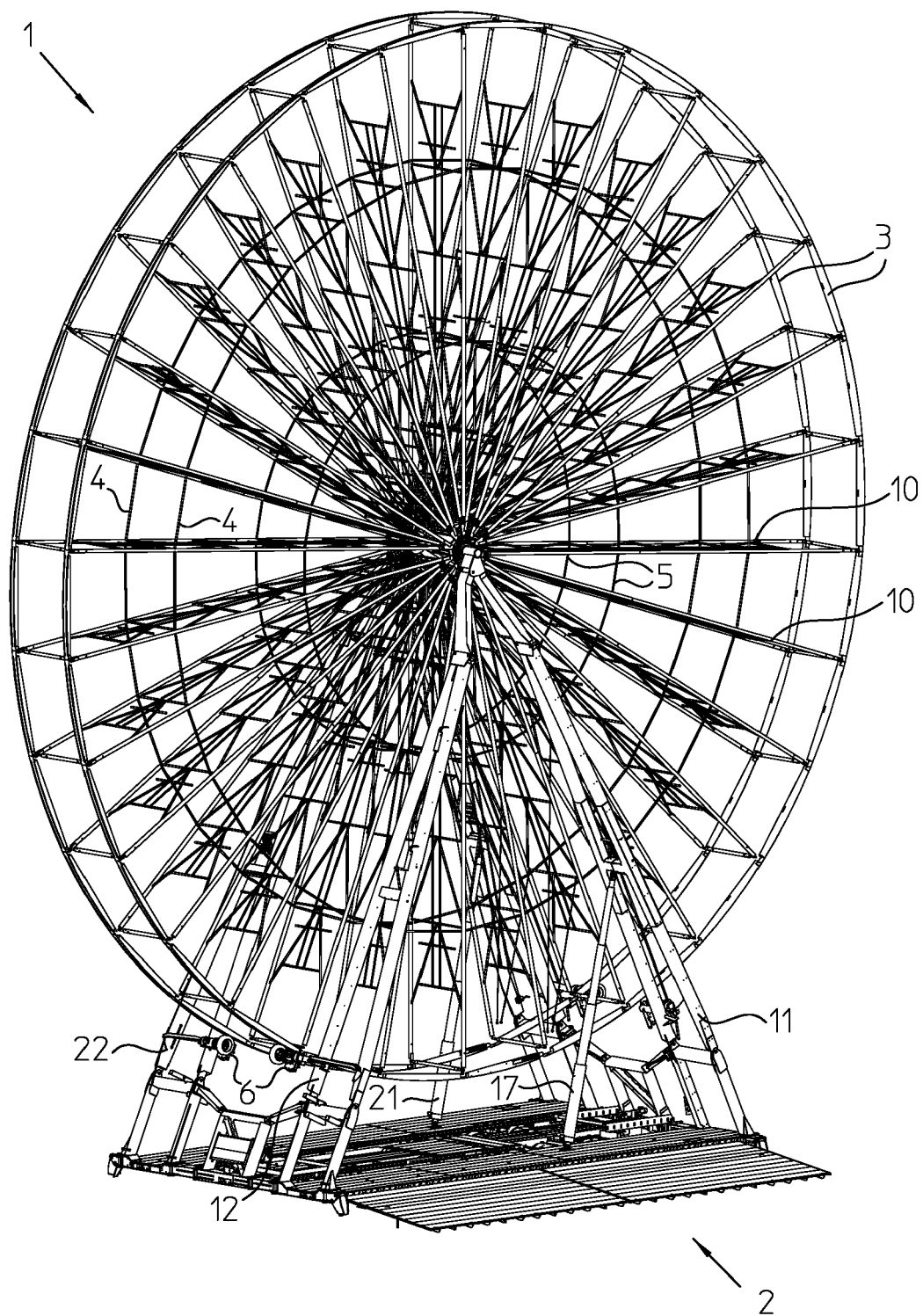
## Claims

1. Ferris wheel, comprising two pairs of masts, wherein the masts in each pair are hingedly connected to each other and wherein each pair of masts is moveable between a folded position and a stretched position, wherein the Ferris wheel is further provided with multiple spokes, two spoke rings for mounting the spokes and multiple ring segments for interconnection of the spokes, **characterized in that** the Ferris wheel comprises a first shaft, which is mounted fixedly on the top of the first pair of masts, wherein a first of the two spoke rings is arranged rotatably around the first shaft, that the Ferris wheel further comprises a second shaft, which is mounted fixedly on the top of the second pair of masts, wherein a second of the two spoke rings is arranged rotatably around the second shaft, wherein, in use of the Ferris wheel, the second shaft is substantially in line with the first shaft at a distance from the first shaft.
2. Ferris wheel according to claim 1, wherein each spoke has two legs that run substantially parallel that are connected to each other by means of a number of rods, wherein a first mounting element on an end of a first leg is arranged for mounting in the first spoke ring and a second mounting element on an end of a second leg is arranged for mounting in the second spoke ring, wherein the spoke is provided with a first crossbar that connects the legs near the ends.
3. Ferris wheel according to claim 1 or 2, wherein the spoke rings are mounted on ends of the first and second shaft that are facing each other.
4. Ferris wheel according to one of the preceding claims, wherein the first shaft comprises a first stub

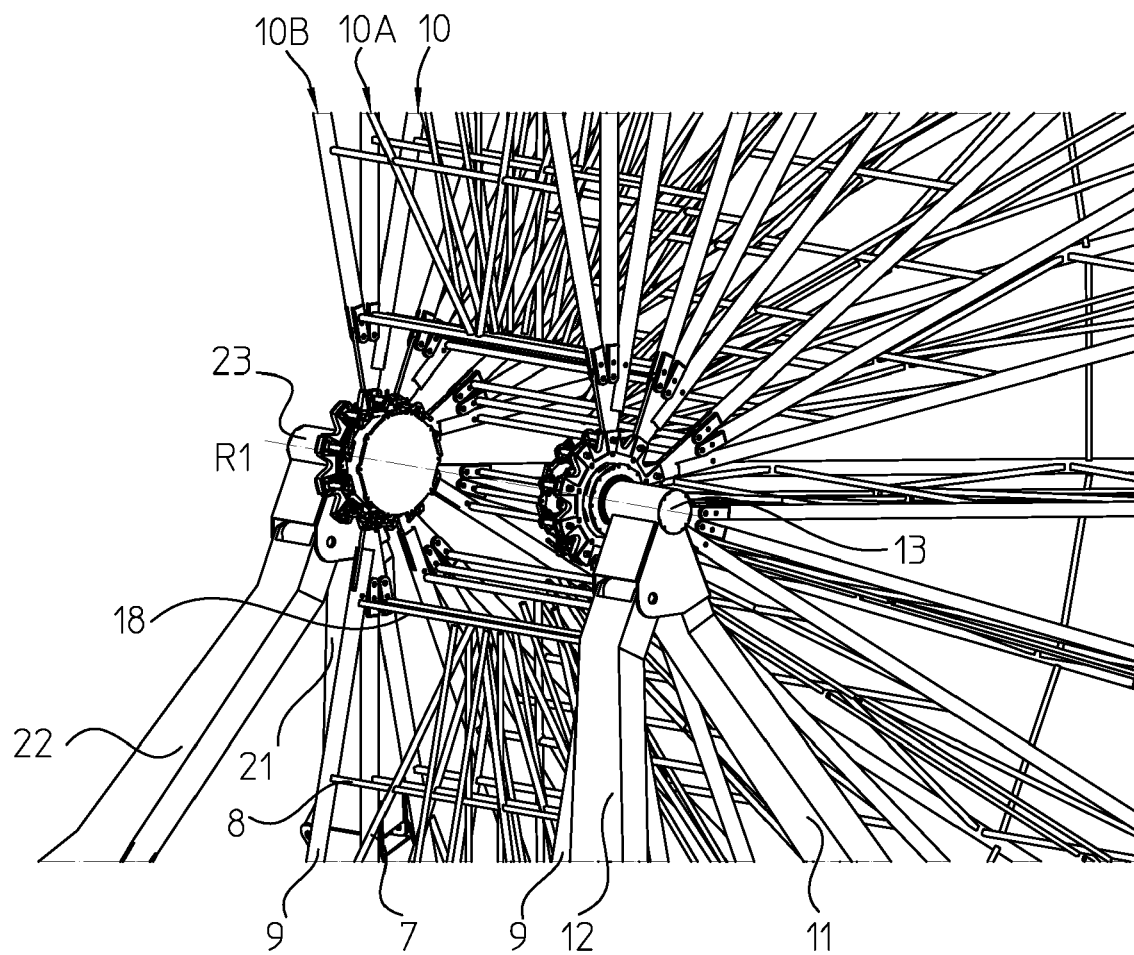
axle and wherein the second shaft comprises a second stub axle.

5. Method for building the Ferris wheel according to one of the preceding claims, wherein the method comprises the following steps

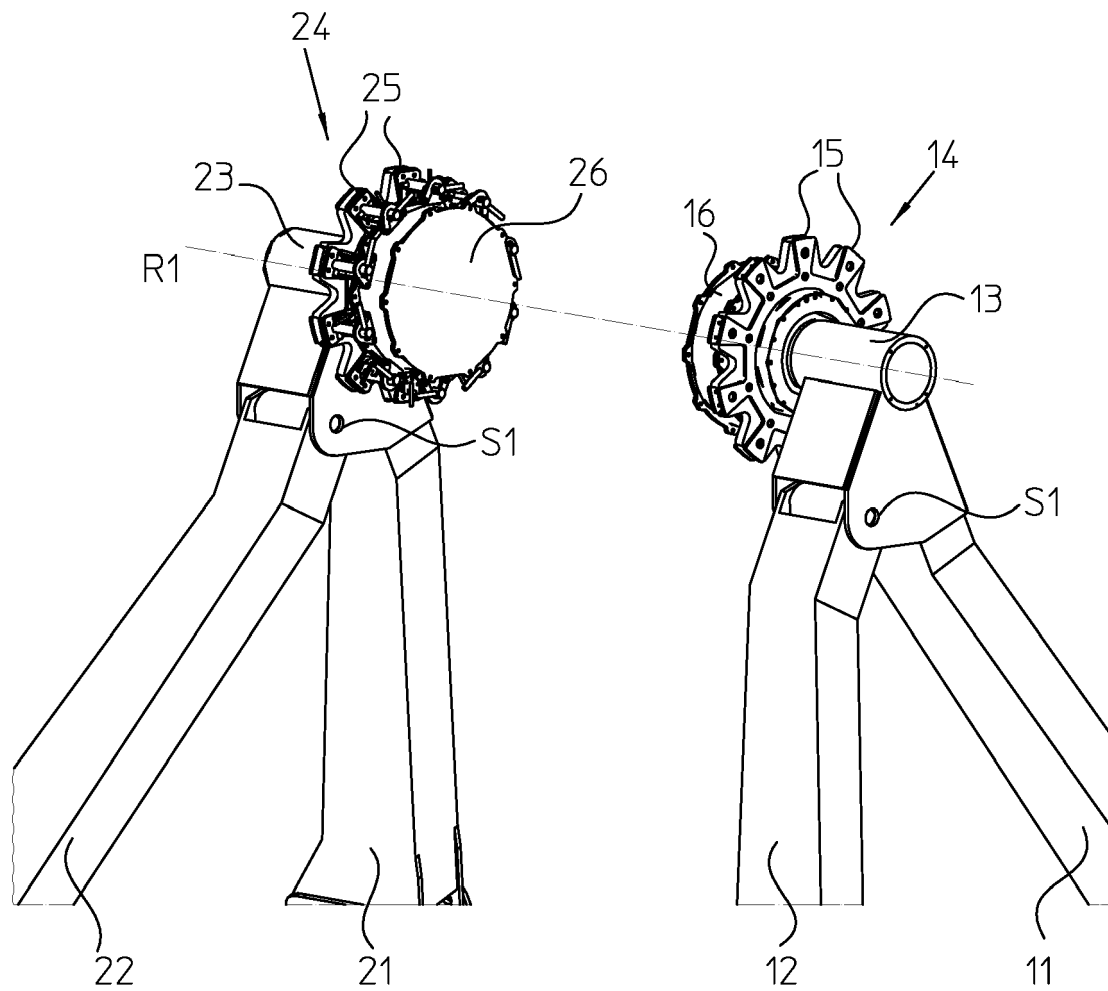
- a) jointly raising the first pair of masts with the first shaft to the stretched position;
- b) jointly raising the second pair of masts with the second shaft to the stretched position;
- c) outlining the first and second shaft on a common axis of rotation;
- d) mounting the spokes in the first spoke ring and in the second spoke ring; and
- e) connecting the spokes with the ring segments.



FIGUUR 1



FIGUUR 2



FIGUUR 3



## EUROPEAN SEARCH REPORT

Application Number

EP 23 15 4412

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Place of search <b>Munich</b>		Date of completion of the search <b>31 May 2023</b>	Examiner <b>Bagarry, Damien</b>
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