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Device to transfer printed products transported in hanging position in clamps spaced apart on a circulating conveyor organ

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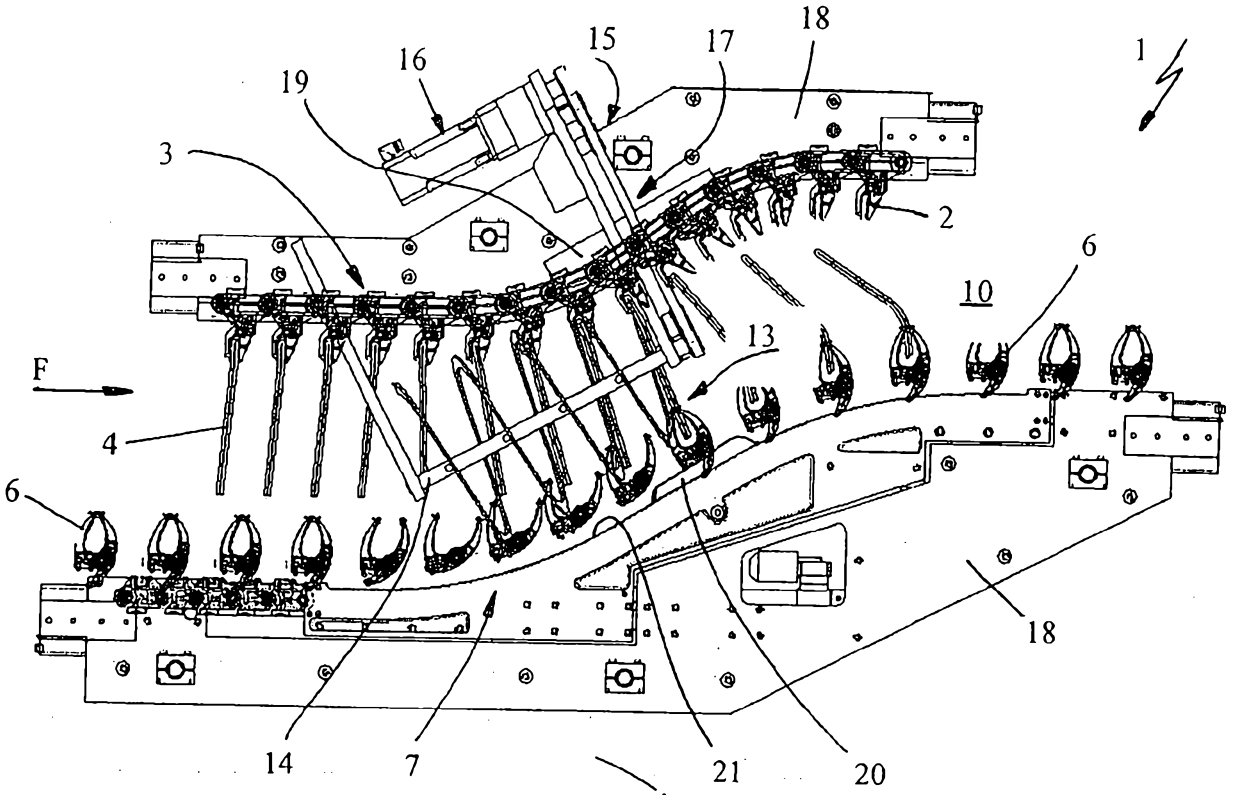
Abstract

A device (1) to transfer printed products (4) transported on a conveying path in clamps (2) spaced apart on a circulating first conveyor (3) hanging transversely to the direction of transport to a second conveyor (5) below the first conveyor (3), said conveyor driven synchronously in the same direction and having grips (6) at regular intervals, with a guiding arrangement (8) accompanying the printed products (4) on a transfer section (7) as well as actuating devices to open the clamps and close the grips, wherein the guiding arrangement (8) has rotors (12, 13) with helix-like construction, which laterally protrude on both sides through the spaces formed between the printed products by the clamps (2) of the first conveyor (3), with helical sections (11) acting in the direction of transport.

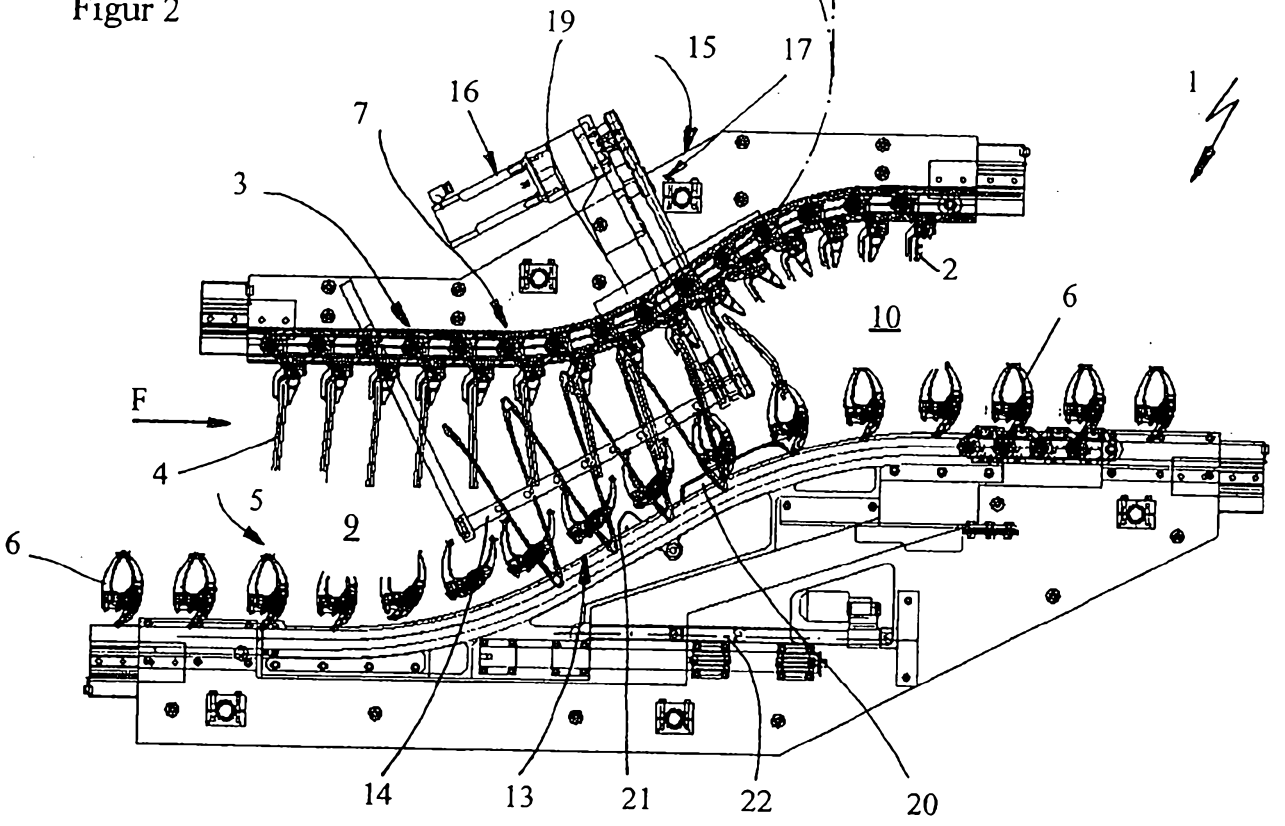
(Fig.1)

2007200364 29 Jan 2007

Figur 1



Figur 2



2007200364 29 Jan 2007

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COMPLETE SPECIFICATION

Standard Patent

Applicant(s):

MULLER MARTINI HOLDING AG

Invention Title:

Device to transfer printed products transported in hanging position in clamps spaced apart on a circulating conveyor organ

The following statement is a full description of this invention, including the best method for performing it known to me/us:

Device to transfer printed products transported in hanging position in clamps spaced apart on a circulating conveyor organ

The invention concerns a device to transfer printed products transported on a conveying path.

EP 0 380 921 A2 discloses a device to accept printed sheets transported in a first direction hanging in a first conveying system and to transfer them to a second conveying system, that accepts individually the printed sheets and transports them in a second direction. To ensure a trouble-free acceptance and transfer of the printed sheets, a compartmentalised wheel is provided between the conveying systems, that by virtue of openable and closable compartments is constructed to accept the printed sheets, while after turning the printed sheets are transferred to the second conveying system.

A printer and publisher based in Neu-Isenburg, Germany, has been producing since 1989 printed products, for example newspapers, journals, etc., using an insertion machine EM 40 of the Müller Martini group, which are discharged from the production process using a discharge transporter. To stabilise and position the flat printed products, held hanging in the discharge transporter, guiding elements are introduced into the conveying flow over a certain section of the conveying path and moved in the direction of transport, so that the printed products are so guided by the guiding elements over this section of the conveying path, that at one location they assume a defined, stable position.

An object is to look for another way to achieve a stable position of the printed products transported in a conveying flow, to enable their transfer from a circulating conveyor organ to the grip of a conveyor.

According to an aspect there is provided a device for transferring print products conveyed along a conveying path in a conveying direction, comprising a circulating conveying element including spaced apart clamps to suspend the print products transverse to the conveying direction:
conveyor driven to move approximately in the same direction and synchronously

2007200364 28 Sep 2012

below the conveying element, the conveyor including grippers spaced at regular intervals, a guide arrangement disposed along a transfer segment in which the print products are transferred from the circulating conveying element to the conveyor, the guide arrangement accompanying the print products along the transfer segment and including spiral rotors having spiral sections which respectively extend from opposite sides into spaces between the print products resulting from the spacing of the clamps on the conveying element, wherein the spiral sections are effective in the conveying direction to stably position the print products; and

activation devices operatively arranged to open the clamps and close the grippers to effect the transfer in the transfer segment of a respective one of the print products from one of the clamps on the circulating conveying element to one of the grippers on the conveyor.

By virtue of this constructive step an accurate and gentle transfer of the printed products can be carried out.

In the following the invention is explained based on an embodiment, by referring to the drawing, to all details not explicitly explained in the description. The drawings show in:

Fig.1 - a lateral view of the device according to the invention,

Fig.2 - the device illustrated in Fig.1, in a changed operating position,

Fig.3 - a view in accordance with arrow *F* of the device illustrated in Fig.1, and

Fig.4 - a lateral view of the guiding arrangement, illustrated in Figs.1 to 3.

Figs.1 and 2 show a device 1 to transfer printed products 4 transported on a conveying path in clamps 2 spaced apart on a circulating first conveyor 3 hanging

2007200364 28 Sep 2012

transversely to the direction of transport *F* to a second conveyor 5 provided below it and running in the same direction over the transfer section, the second conveyor having grips 6 at regular intervals which accept the printed products 4 from the clamps 2. The transfer section is formed by a guiding arrangement 8, that displaces the transported printed products 4 to a transferring position and stabilises them prior to transferring them to the grips 6. When viewed in the direction of transport of the printed products 4, over the transfer section 7 the first conveyor 3 and the second conveyor 5 run obliquely upwards over a run-in section 9 and then consequently continuously draw closer to one another. The first conveyor 3 and the second conveyor 5 assume a curving path and assume a

curved course that blends into the exit region 10 of the transfer section 7, while in the exit region 10 the second conveyor 5 continues to run approximately horizontally, whereas the course of the first conveyor 3 in the exit region 10 is horizontal or directed upward.

In the ascending transfer section 7 as guiding arrangement 8 helical sections 11 of a helix-like rotor 12 are provided on both sides of the conveying flow, formed by the printed products 4, that act in the direction of transport and protrudes through the spaces formed by the distances between the clamps, the hindmost helical section 11 of which, viewed in the direction of transport, protrudes into a free space of the conveying flow behind a printed sheet 4 transported in a clamp 2 of the first conveyor 3, subsequently accompanied by further helical sections and finally supported in a defined transfer position. When a transfer position is reached, the transfer process is initiated by the allocated grip 6 of the second conveyor 5 grasping the printed product 4 and immediately released by the clamp 2 of the first conveyor 3.

Viewed in the direction of transport of the printed products 4 the helix-like rotors 12, 13 rotate in opposite directions, so that their free rear ends protrude into a free space between two printed products 4 (see arrows P, P' in Fig.3).

With increasing length and accompanying section of the helical sections 11 the rotors 12, 13 taper with the shape of a truncated cone (see also Fig.4).

The incline below the helical sections 11 similarly decreases in the direction of transport of the printed products 4. The helical sections 11 of the rotors 12, 13 can be made from spring steel, spring wire or plastic material.

Viewed in the direction of transport, the helix-like rotors 12, 13 have an obliquely upward pointing axis of rotation, that is formed by a shaft 14.

Fig.3 shows the device 1 with helix-like rotors 12, 13 provided on both sides of the printed products transported by the first conveyor 3, said rotors driven in opposing directions while their distance from one another can be adjusted.

Figs.1 and 2 show a driving mechanism 15, comprising a geared motor 16, that is connected with the shaft 14 via a toothed belt 17. The driving mechanism 15 and the rotors 12, 13 are fastened on a frame 18 of the device 1. To activate the clamps 2 of the first conveyor 3 and the grips 6 of the second conveyor 5 actuating devices 19, 20 are provided, for which purpose the first conveyor 3 and the second conveyor 5 are to be guided in a form-locked manner at least over the transfer section 7, so that the closing of the grips 6 and the opening of the clamps 2 of the first conveyor 3 could be carried out by mechanical means 19, 20. To transfer printed products 4 of various sizes, for example having different lengths, the upward pointing guiding section is displaceably provided on the transfer section 7, so that by displacing the guiding section printed products 4 of various sizes can be transferred from the first conveyor 3 to the second conveyor 5. For this purpose a form-locking guide 21 is displaceably provided for the conveyor 5 on the transfer section 7. Fig.1 shows the guide 21 in a position for printed products 4 which are longer than those illustrated in Fig.2. Fig.2 shows an extended piston/cylinder unit 22, by means of which the guide 21 is displaced to the left in the transfer section 7, so that the distance between the first conveyor 3 and the second conveyor 5 in the transfer section 7 is smaller than in Fig.1.

Due to the fact that the clamps 2 of the first conveyor 3 are closer to one another than the grips 6 of the second conveyor 5, the first conveyor 5 is driven at a greater speed than the second conveyor 3.

In the claims which follow and in the preceding description of the invention, except where the context requires otherwise due to express language or necessary implication, the word "comprise" or variations such as "comprises" or "comprising" is used in an inclusive sense, i.e. to specify the presence of the stated features but not to preclude the presence or addition of further features in various embodiments of the invention.

It is to be understood that, if any prior art publication is referred to herein, such reference does not constitute an admission that the publication forms a part of the common general knowledge in the art, in Australia or any other country.

2007200364 28 Sep 2012

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A device for transferring print products conveyed along a conveying path in a conveying direction, comprising a circulating conveying element including spaced apart clamps to suspend the print products transverse to the conveying direction: conveyor driven to move approximately in the same direction and synchronously below the conveying element, the conveyor including grippers spaced at regular intervals, a guide arrangement disposed along a transfer segment in which the print products are transferred from the circulating conveying element to the conveyor, the guide arrangement accompanying the print products along the transfer segment and including spiral rotors having spiral sections which respectively extend from opposite sides into spaces between the print products resulting from the spacing of the clamps on the conveying element, wherein the spiral sections are effective in the conveying direction to stably position the print products; and
activation devices operatively arranged to open the clamps and close the grippers to effect the transfer in the transfer segment of a respective one of the print products from one of the clamps on the circulating conveying element to one of the grippers on the conveyor

2. A device according to claim 1 wherein the conveying element and the conveyor change direction and move upward in an intake region of the transfer segment, as seen in the conveying direction, so that the conveying element and conveyor continuously move toward each other.

3. A device according any one of the preceding claims, wherein the conveyor follows a curved path in the transfer segment.

4. A device according to claim 3, wherein the conveyor moves in a substantially horizontal direction in a discharge region of the transfer segment.

5. A device according to any one of claims 1 to 4, wherein each spiral rotor has a diameter that continues in a cone shape, as seen in conveying direction.

2007200364 28 Sep 2012

6. A device according to any one of claims 1 to 5, wherein the spiral sections of each rotor have a decreasing pitch as seen in the conveying direction of the print products.

7. A device according to any one of claims 1 to 6, wherein each spiral rotor includes a drive shaft having an axis of rotation that slopes in an upward direction, as seen in the conveying direction.

8. A device according to any one of claims 1 to 7, wherein the spiral rotors are driven in opposite directions and are arranged so that the spacing between them is adjustable.

9. A device according to any one of claims 1 to 8, further including a driving arrangement to which the spiral rotors are drive-connected.

10. A device according to any one of claims 1 to 9, wherein actuation devices are arranged in the transfer segment.

11. A device according to any one of claims 1 to 10, wherein a distance between the conveying element and the conveyor is adjustable in the transfer segment.

12. A device according to claim 11, wherein at least the conveyor includes section that is upward sloping in the transfer segment and that is adjustable to change the spacing between the conveying element and the conveyor in the transfer segment.

13. A device according to claim 12, wherein the section of the conveyor is arranged to be displaceable in a longitudinal section in the transfer segment.

14. A device according to any one of claims 1 to 13, wherein the spacing between the clamps on the conveying element is less than the spacing between the grippers on the conveyor.

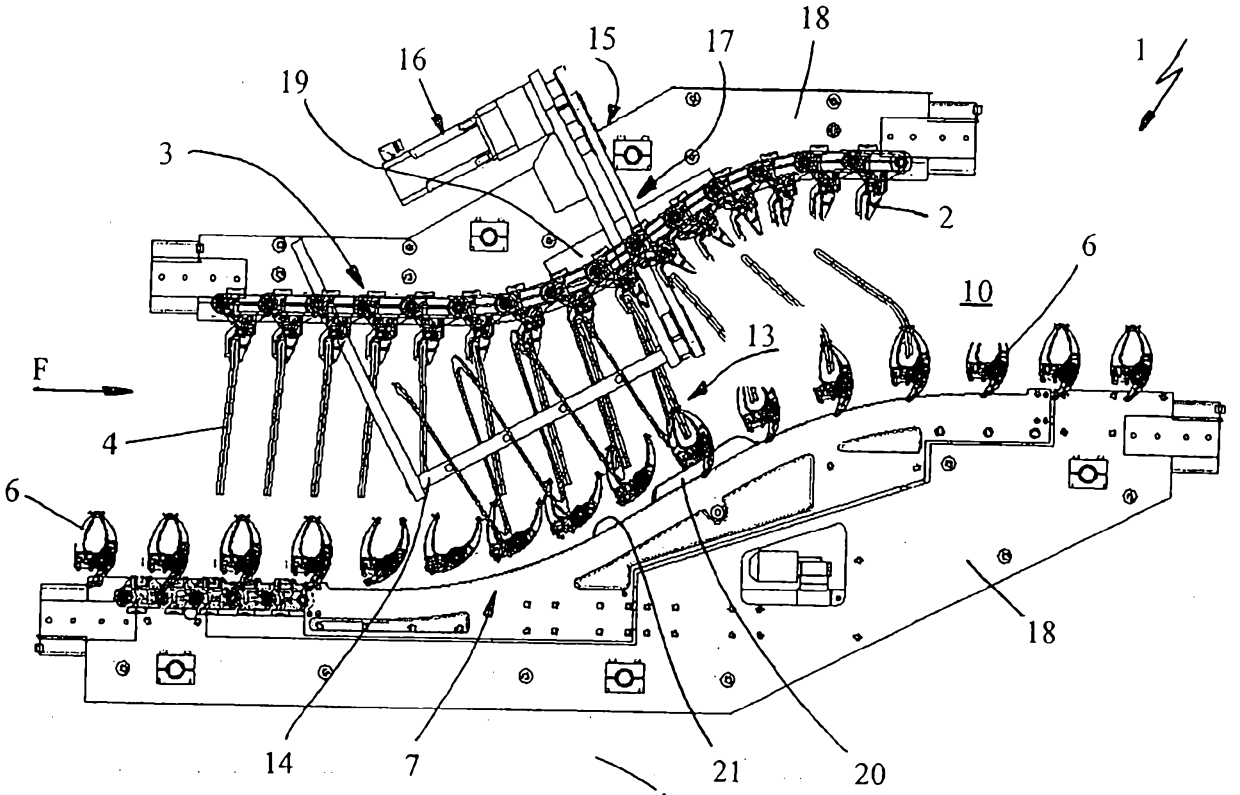
15. A device according to claim 14, wherein the conveyor operates at a faster conveying speed than the conveying element.

2007200364 28 Sep 2012

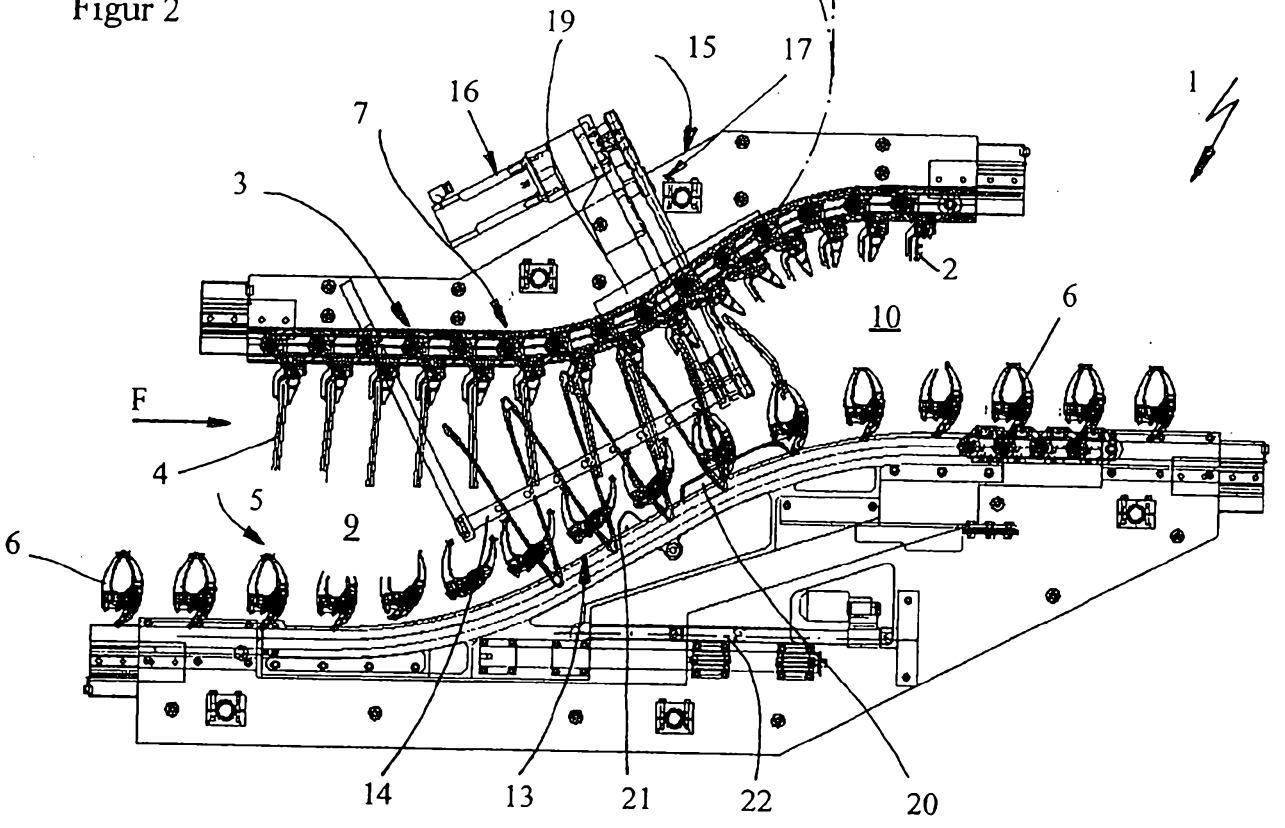
16. A device as claimed in claim 1 and substantially as herein described with reference to the accompanying drawings.

2007200364 29 Jan 2007

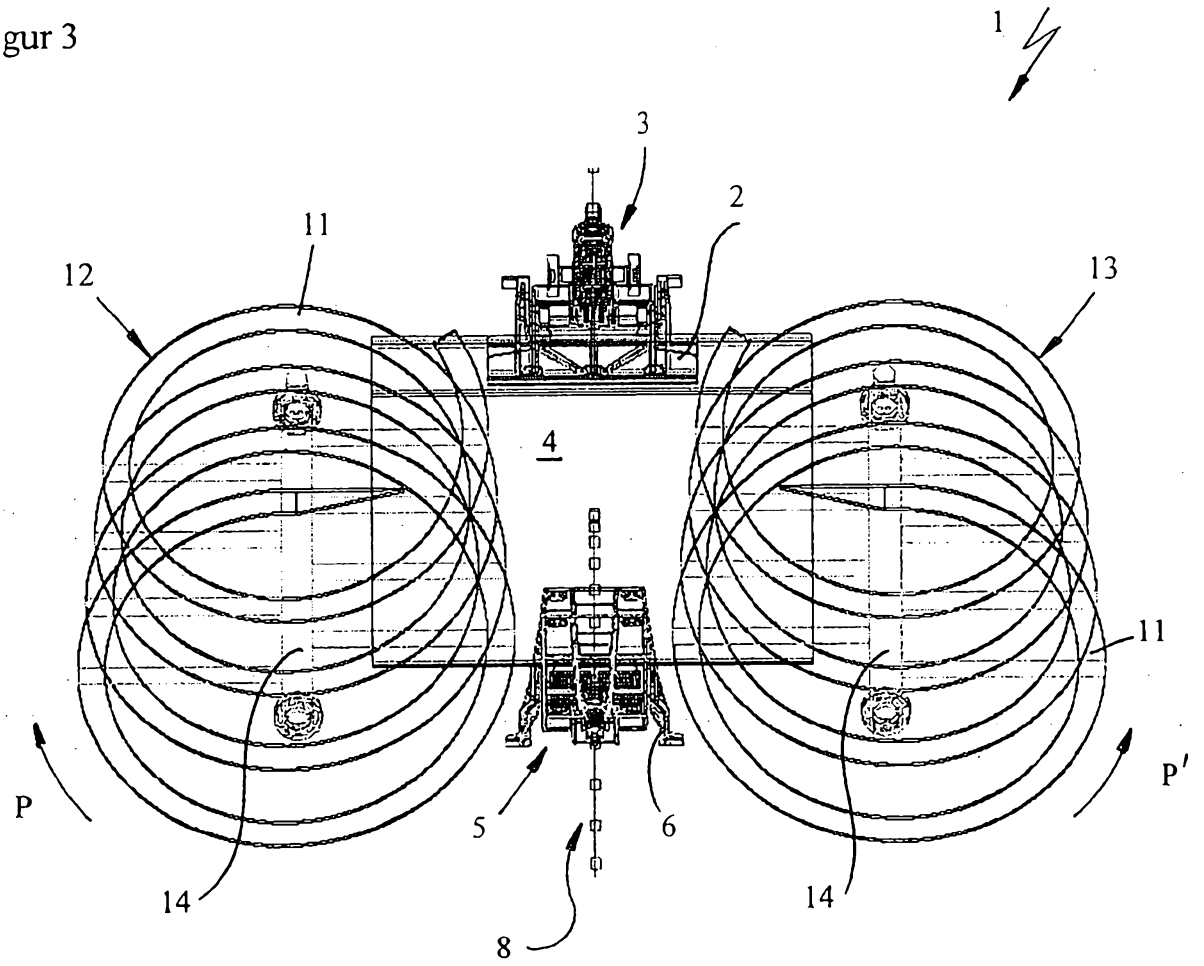
Figur 1



Figur 2



Figur 3



Figur 4