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(54) Device to control the heald frames of looms in cloth weaving

(57) Device to control the heald frames of looms in cloth weaving, comprising a shaft (1) caused to rotate by the loom, said shaft (1) controlling at least two driving members (OA) consisting of two disks (2) - one for each member (OA) - fixed to said shaft (1) and inclined by equal and opposed angles, and of two corresponding frames (3) mounted on spindles (4, 5) perpendicular to

the shaft (1) and each cooperating with the periphery of its own disk (2) so as to be oscillated thereby, said spindles (5) supporting cross arms (6) onto which there are mounted pairs of connecting rods (B), each controlling a heald frame (Q).

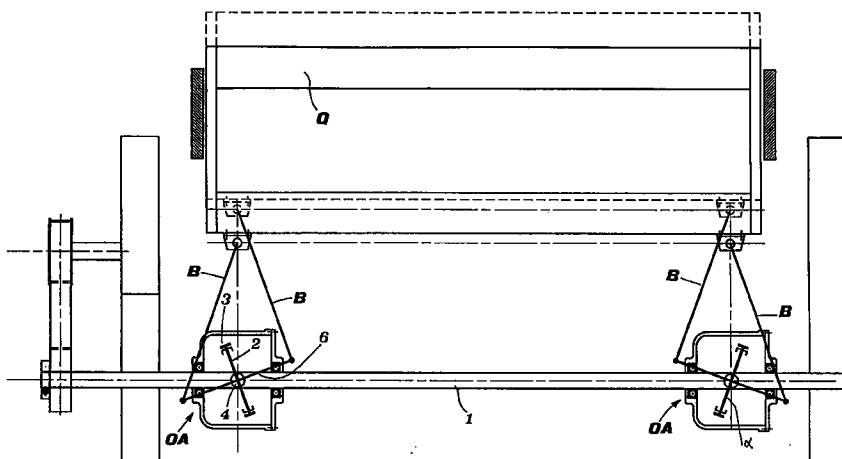


FIG.1

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Description

The present invention refers to a device to control the heald frames of looms in cloth weaving (that is, when the loom is weaving a simple weft and warp cloth).

It is known that among the problems which constructors have to face in modern looms, due to their high speed, there is the control of the heald frames, generally obtained through complex leverages involving a lot of components, several articulations and high inertias and frictions. Such control means, which have since long shown their limits (high imprecision, great noise, frequent need of adjustments and revisions), now risk, with the constant increase of loom speeds, to become unutilizable both as far as working and as far as maintenance; this particularly applies to cloth weaving - i.e. when the loom is weaving a simple weft and warp cloth - as, in this case, the looms can reach top speeds.

The present invention proposes to solve this problem by controlling the heald frames of looms in cloth weaving with a fully original device. Said device comprises a shaft, caused to rotate by the loom, which controls at least two driving members consisting of two disks - one for each member - fixed to said shaft and inclined by equal and opposed angles, and of two corresponding frames, mounted on spindles perpendicular to the shaft and each cooperating with the periphery of its own disk so as to be oscillated thereby, said spindles supporting cross arms onto which there are mounted pairs of connecting rods, each controlling a heald frame. Said frames can be C-shaped, or ring shaped, while said arms supported by the spindles are of different length, according to the strokes having to be imparted on the heald frames which each of them controls through the respective pair of connecting rods.

The invention is now described in further detail, with reference to some preferred embodiments thereof, illustrated only by way of example on the accompanying drawings, in which:

fig. 1 diagrammatically illustrates the whole unit forming the device of the present invention, which comprises two driving members for the heald frames and pairs of connecting rods interposed between said members and the frames;

fig. 2 is a sectional view of a first embodiment of one of the driving members of the device according to the invention;

fig. 3 is a view similar to that shown in fig. 2, illustrating a second embodiment of one of the driving members of the device according to the invention; and

fig. 4 is an axonometric view of the driving member shown in fig. 3, including the control arms to which said connecting rods are linked.

With reference to the drawings, the device of the present invention to control the heald frames Q of a loom, comprises a shaft 1, caused to rotate by the loom,

and at least a pair of members OA associated to said shaft 1, to drive said frames Q by way of connecting rods B.

In each of the driving members OA, the shaft 1 carries a disk 2, fixed thereto with an inclination forming an angle α . The angle of inclination of the disk 2 in the first member OA is equal but opposed to that of the disk 2 in the second member OA (see fig. 1). In said driving members OA, around each of the disks 2 there is mounted a frame 3 which, in the embodiments shown, is ring shaped. As shown in fig. 4, the frame 3 is mounted rotating on opposed spindles 4 and 5, the spindle 5 extending to support a plurality of cross arms 6. The frame 3 is slidably engaged with the corresponding disk 2. Said engagement can be obtained, either through pairs of pins 7 engaging, in the manner of a fork, the periphery of the disk 2 with the interposition of rolling bearings 8 (embodiment of fig. 2), or by means of an intermediate ring 9, rotatably mounted along the periphery of the disk 2 with the interposition of a rolling bearing 10, and of a pair of opposed pins 11 emerging from said ring 9 and mounted revolving into seats of the frame 3, with the interposition of ball bearings 12 (embodiment of figs. 3 and 4). Each driving member OA is positioned inside a case 13, comprising seats with needle bearings 14 into which rotate the spindles 4 and 5 of the frame 3. The case 13 also supports the shaft 1 which rotates on bearings 15.

As shown in fig. 1, a pair of connecting rods B is mounted on each of the cross arms 6 (figs. 1 and 4) of the driving members OA of the aforescribed device, each of said rods B controlling a heald frame Q; said arms 6 are of different length, according to the strokes having to be imparted on the heald frames Q which each of them controls through the respective pair of connecting rods B.

In operation, the rotation of the shaft 1 and of the disks 2 fixed thereto and inclined by equal and opposed angles in the two driving members OA, determines - due to the continuous change of position in space of the disks 2, between two extreme positions, for example those shown in full lines and in dashed lines in fig. 3 - a constantly oscillating movement of the frames 3 of said driving members about the spindles 4, 5. The cross arms 6, supported by the spindles 5, are thus in turn caused to perform a rapid oscillating movement, which leads, through the connecting rods B, to a corresponding up and down motion of the frames Q. More precisely, one of the connecting rods B of each pair causes the lifting of a frame and the simultaneous lowering of the frame adjacent thereto, and vice versa, in a rapid sequence, as required for cloth weaving in a loom.

The device according to the invention realizes a compact and efficient mechanism, with minimum inertias, a few simple articulations and limited frictions, which ensures an extremely precise control, with a reduced maintenance, and a low noise even at the highest speeds. It is hence apt to solve in a fully satisfactory way the problems being faced.

It is anyhow understood that there could be other practical embodiments of the device according to the invention, differing from the ones described and illustrated; in particular, the driving members OA - with the disks fixed to the shaft of the device and inclined by equal and opposed angles - could be more than two (or could even be just one), depending on the size in width of the heald frames to be controlled.

Claims

1. Device to control the heald frames of looms in cloth weaving, comprising a shaft (1) caused to rotate by the loom, said shaft (1) controlling at least two driving members (OA) consisting of two disks (2) - one for each member (OA) - fixed to said shaft (1) and inclined by equal and opposed angles, and of two corresponding frames (3) mounted on spindles (4, 5) perpendicular to the shaft (1) and each cooperating with the periphery of its own disk (2) so as to be oscillated thereby, said spindles (5) supporting cross arms (6) onto which there are mounted pairs of connecting rods (B), each controlling a heald frame (Q).
2. Device as in claim 1), wherein said frames (3) are ring shaped.
3. Device as in claim 1), wherein said frames (3) are C-shaped.
4. Device as in claims 1) to 3), wherein said arms (6) supported by the spindles (5) are of different length, according to the strokes having to be imparted on the heald frames (Q) which each of them controls through the respective pair of connecting rods (B).
5. Device as in claims 1) to 4), wherein each of said frames (3) cooperates with the corresponding disk (2) through pairs of pins (7) engaging, in the manner of a fork, the periphery of said disk with the interposition of rolling bearings (8).
6. Device as in claims 1) to 4), wherein each of said frames (3) cooperates with the corresponding disk (2) through an intermediate ring (9) rolling on the periphery of said disk, pins (11) of which are rotatably mounted into seats of the frame (3).
7. Device as in claim 6), wherein a rolling bearing (10) is interposed between said disk (2) and said intermediate ring (9), and ball bearings (12) are interposed between said pins (11) and said seats of the frame (3).
8. Device as in claims 1) to 7), wherein each driving member (OA) is positioned inside a case (13), into seats of which there are rotatably mounted the spindles (4, 5) of the frame (3).

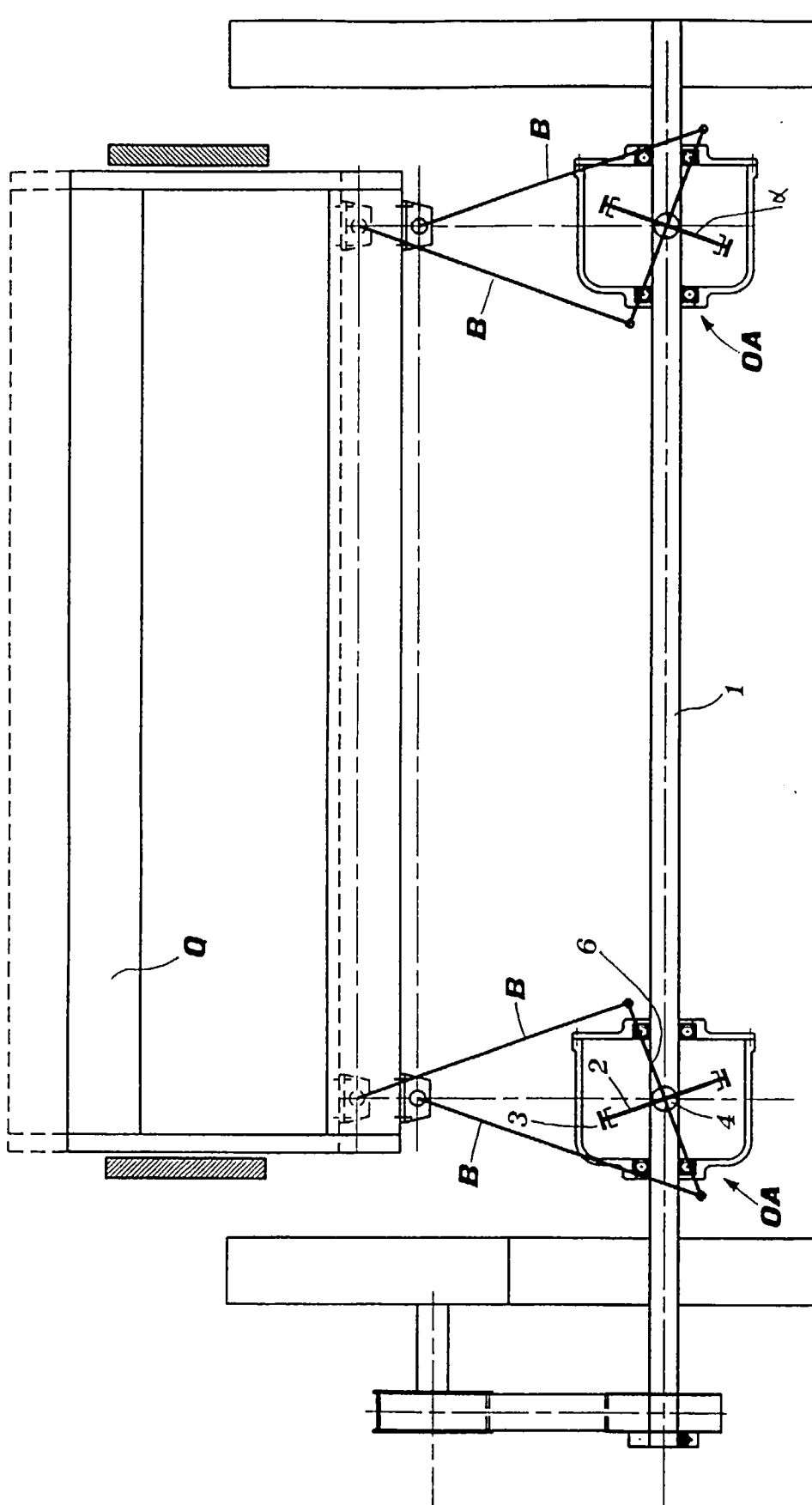


FIG.1

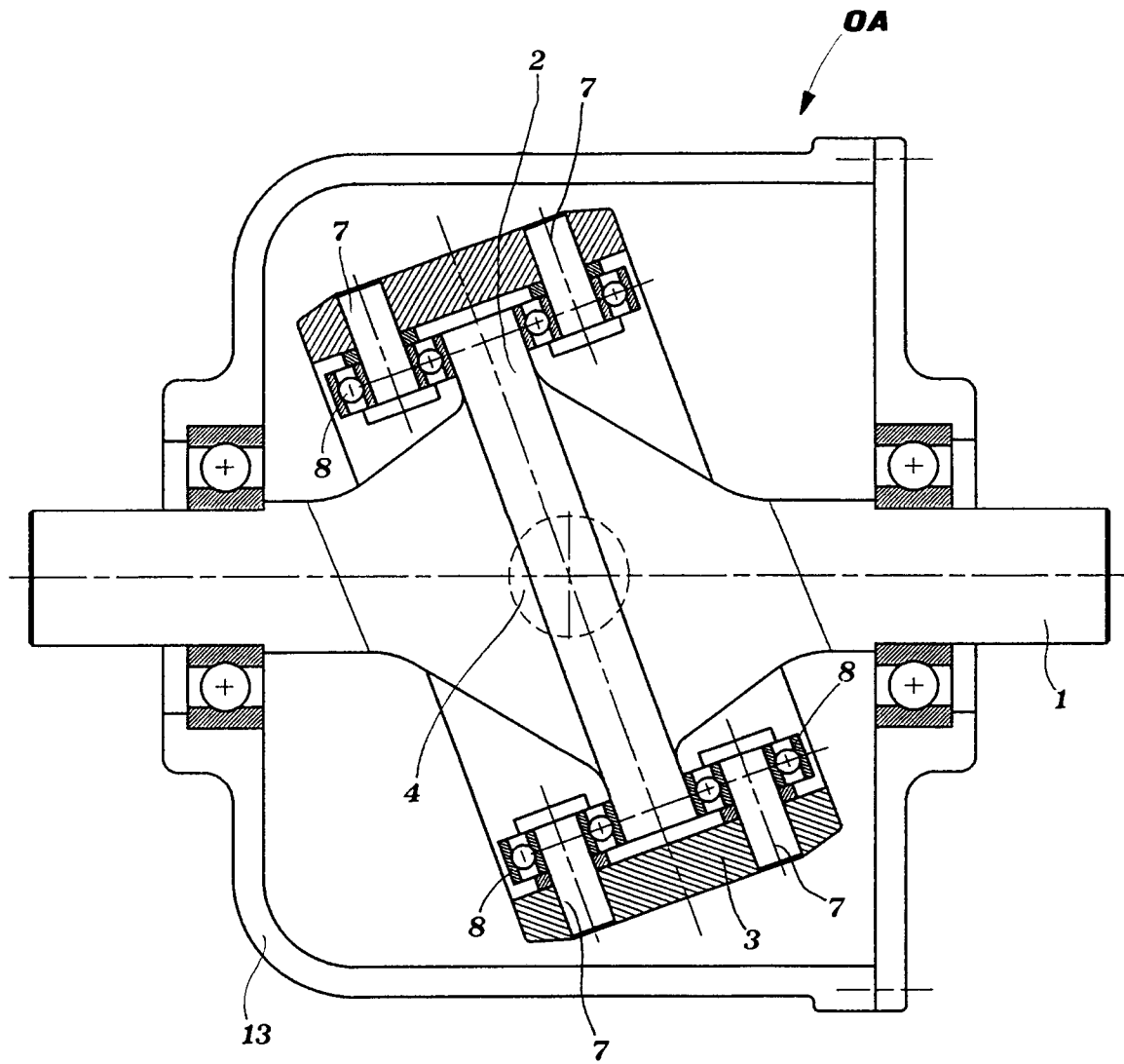


FIG. 2

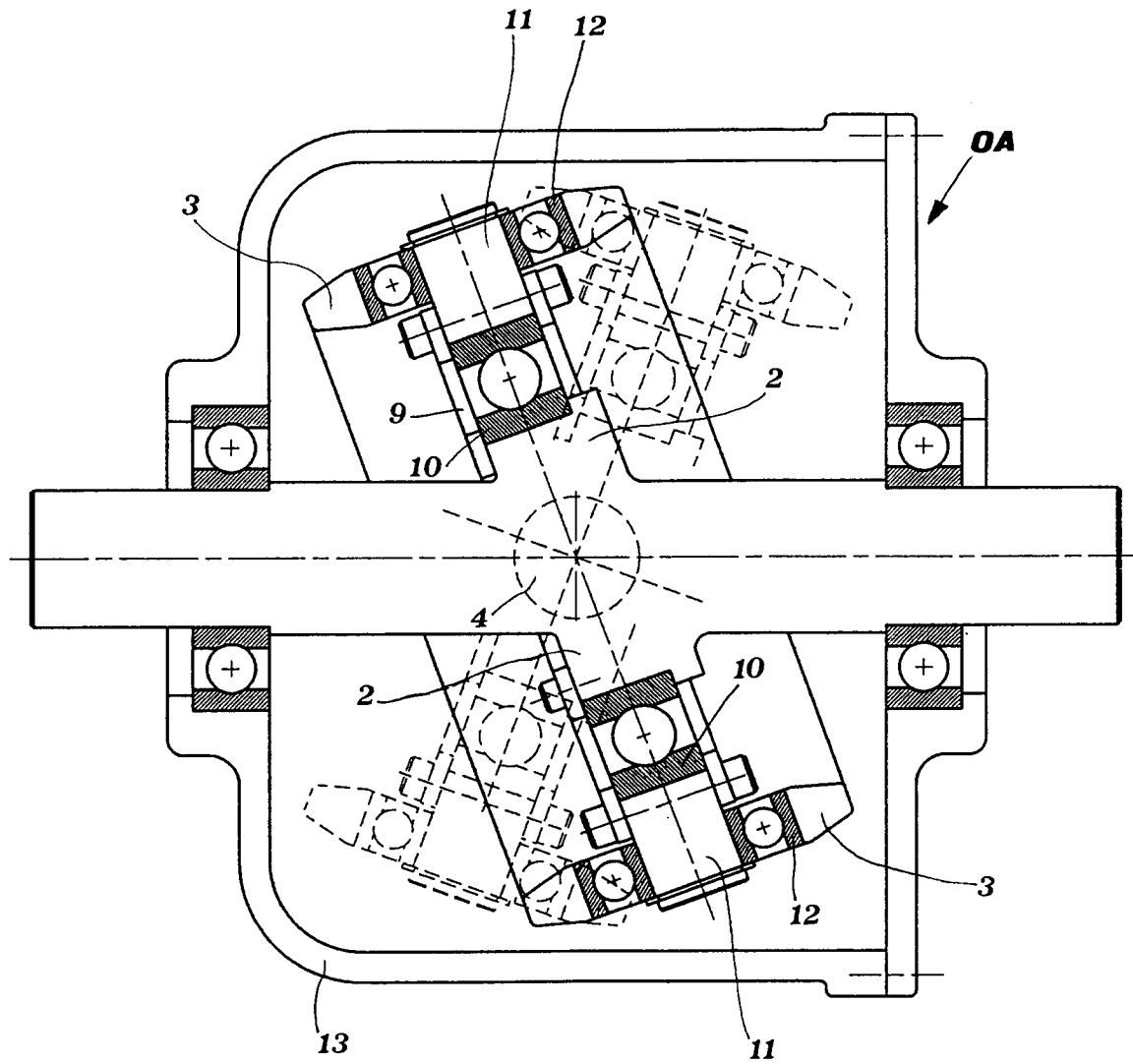


FIG.3

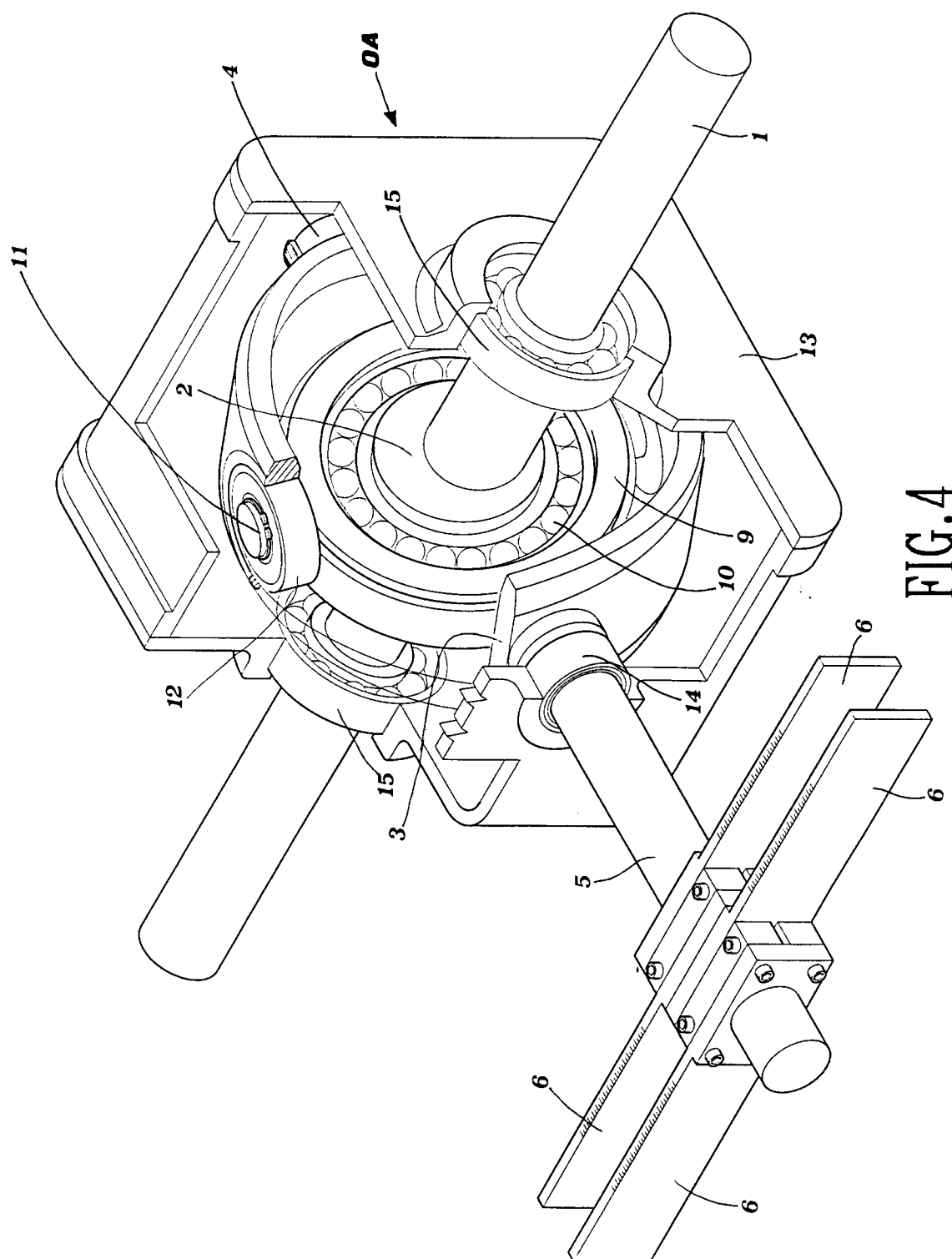


FIG. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 97 10 9313

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	CH 188 290 A (RÜTI) * figure 2 *		D03C5/02
A	US 4 041 986 A (RESCH)		
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			D03C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 3 September 1997	Examiner Boutelegier, C
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