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

Litzenkontrollvorrichtung für Webmaschinen

Dispositif de contrôle des lisses dans les métiers à tisser

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Description

[0001] 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).

[0002] 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 (See for example, US-A-4 041 986), 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.

[0003] 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.

[0004] 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.

[0005] 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.

[0006] 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.

[0007] 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.

[0008] 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.

[0009] 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 re-

duced 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.

[0010] 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).

Patentansprüche

1. Vorrichtung zum Steuern der Schäfte von Webmaschinen bei dem Weben von Tüchern, mit einer Welle (1), die von der Webmaschine zur Drehung veranlaßt wird, wobei die Welle (1) wenigstens zwei Antriebselemente (OA) steuert, die aus zwei Scheiben (29) - eine für jedes Element (OA) -, die auf der Welle (1) befestigt sind und um gleiche und gegenüberliegende Winkel geneigt sind, und zwei entsprechende Rahmen (3), die auf den Spindeln (4, 5) senkrecht zu der Welle (1) montiert sind und jeweils mit dem umfang der eigenen Scheibe (2) zusammenwirkt, um mit dieser zu schwingen, besteht, wobei die Spindeln (5) Querarme (6) tragen, auf denen Paare von Verbindungsstangen (B) montiert sind, die jeweils einen Schaft (Q) steuern.
2. Vorrichtung nach Anspruch 1, wobei die Rahmen (3) ringförmig sind.
3. Vorrichtung nach Anspruch 1, wobei die Rahmen (3) C-förmig sind.
4. Vorrichtung nach den Ansprüchen 1 bis 3, wobei die Arme (6), die von den Spindeln (5) getragen werden, von unterschiedlicher Länge sind, entsprechend den Hieben, die auf die Schäfte (Q) aufzubringen sind, wobei jeder von diesen über das jeweilige Paar von Verbindungsstangen (B) wirkt.
5. Vorrichtung nach einem der Ansprüche 1 bis 4, wobei jeder der Rahmen (3) mit der entsprechenden Scheibe (2) über Paare von Stiften (7) zusammenwirkt, die nach Art und weise einer Gabel die Peripherie der Scheibe unter Zwischenschaltung von Kugellagern (8) ergreift.
6. Vorrichtung nach einem der Ansprüche 1 bis 4, wobei jeder der Rahmen (3) mit der entsprechenden Scheibe (2) über einen Zwischenring (9) zusammenwirkt, der auf dem Umfang der Scheibe rollt, wobei Stifte (11) der Scheibe drehbar in Sitzen des Rahmens (3) montiert sind.
7. Vorrichtung nach Anspruch 6, wobei ein Kugellager (10) zwischen der Scheibe (2) und dem Zwischenring (9) montiert ist und Kugellager (12) zwischen den Stiften (11) und den Sitzen des Rahmens (3) angeordnet sind.
8. Vorrichtung nach einem der Ansprüche 1 bis 7, wo-

bei jedes Antriebselement (OA) im Inneren eines Gehäuses (13) positioniert ist, wobei die Spindeln (4, 5) des Rahmens (3) in Sitzen des Gehäuses (13) drehbar montiert sind.

5

quel chaque organe d'entraînement (OA) est positionné à l'intérieur d'un boîtier (13), dans des sièges duquel sont montées en rotation les broches (4, 5) du châssis (3).

Revendications

1. Dispositif pour commander les cadres à lisses de métiers dans le tissage simple, comprenant un arbre (1) amené à tourner par le métier, ledit arbre (1) commandant au moins deux organes d'entraînement (OA) consistant en deux disques (2) - un pour chaque organe (OA) - fixés audit arbre (1) et inclinés sur des angles égaux et opposés, et en deux châssis (3) correspondants montés sur des broches (4, 5) perpendiculaires à l'arbre (1) et coopérant chacun avec la périphérie de son propre disque (2) de manière à avoir un mouvement oscillant produit par celui-ci, lesdites broches (5) supportant des traverses (6) sur lesquelles sont montées des paires de bielles (B), commandant chacune un cadre à lisses (Q). 10 15 20
2. Dispositif selon la revendication 1, dans lequel lesdits châssis (3) sont annulaires. 25
3. Dispositif selon la revendication 1, dans lequel lesdits châssis (3) sont en forme de C. 30
4. Dispositif selon les revendications 1 à 3, dans lequel lesdites traverses (6) supportées par les broches (5) ont une longueur différente, selon les courses devant être communiquées aux cadres à lisses (Q) que chacune d'elles commande via la paire respective de bielles (B). 35
5. Dispositif selon les revendications 1 à 4, dans lequel chacun desdits châssis (3) coopère avec le disque correspondant (2) via des paires de tiges (7) engageant, à la manière d'une fourche, la périphérie dudit disque avec des paliers à roulement (8) intercalés. 40
6. Dispositif selon les revendications 1 à 4, dans lequel chacun desdits châssis (3) coopère avec le disque correspondant (2) via un anneau intermédiaire (9) roulant sur la périphérie dudit disque, des tiges (11) de l'anneau étant montées en rotation dans des sièges du châssis (3). 45 50
7. Dispositif selon la revendication 6, dans lequel un palier à roulement (10) est intercalé entre ledit disque (2) et ledit anneau intermédiaire (9), et des roulements à billes (12) sont intercalés entre lesdites tiges (11) et lesdits sièges du châssis (3). 55
8. Dispositif selon les revendications 1 à 7, dans le-

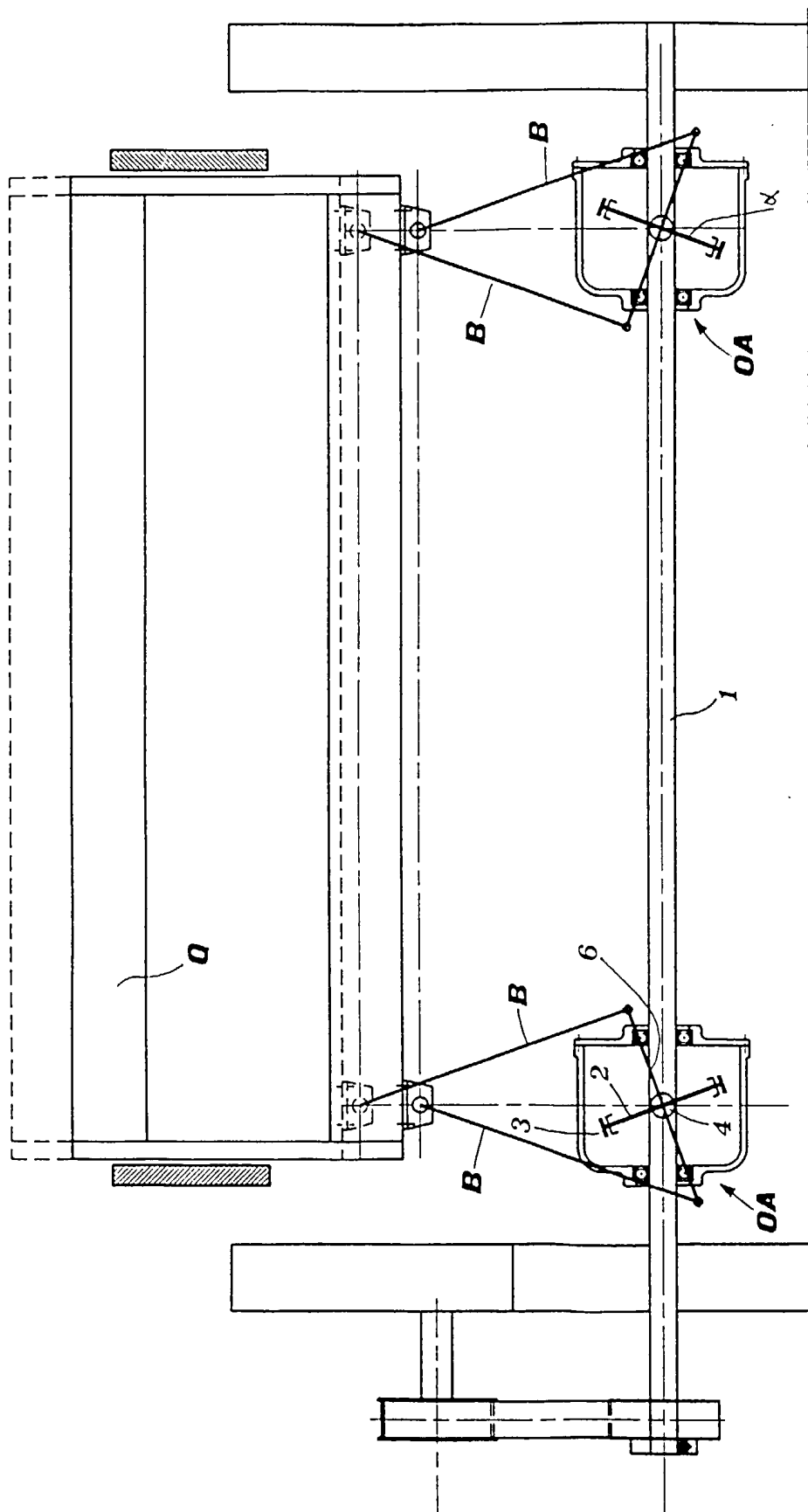


FIG.1

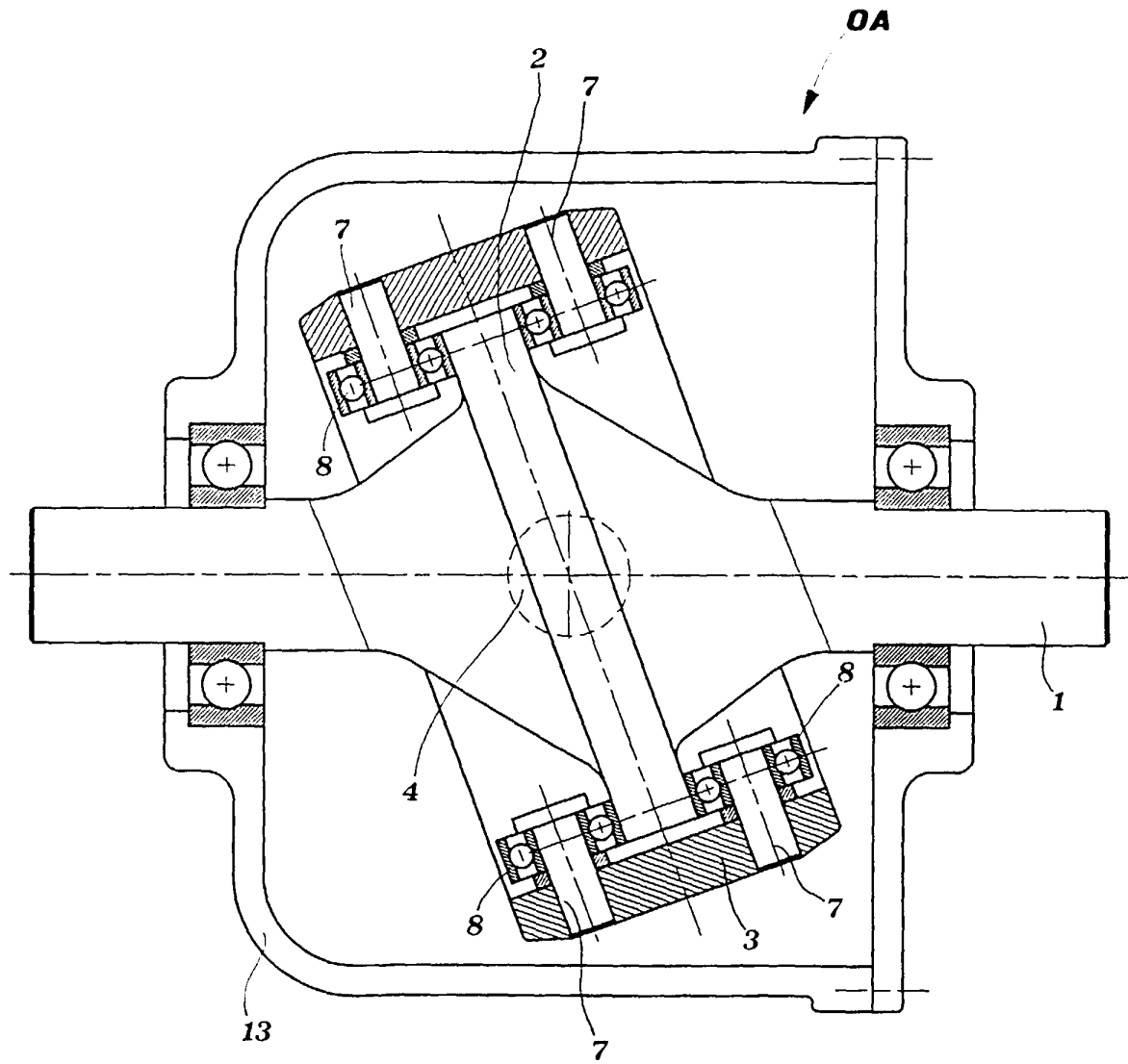


FIG.2

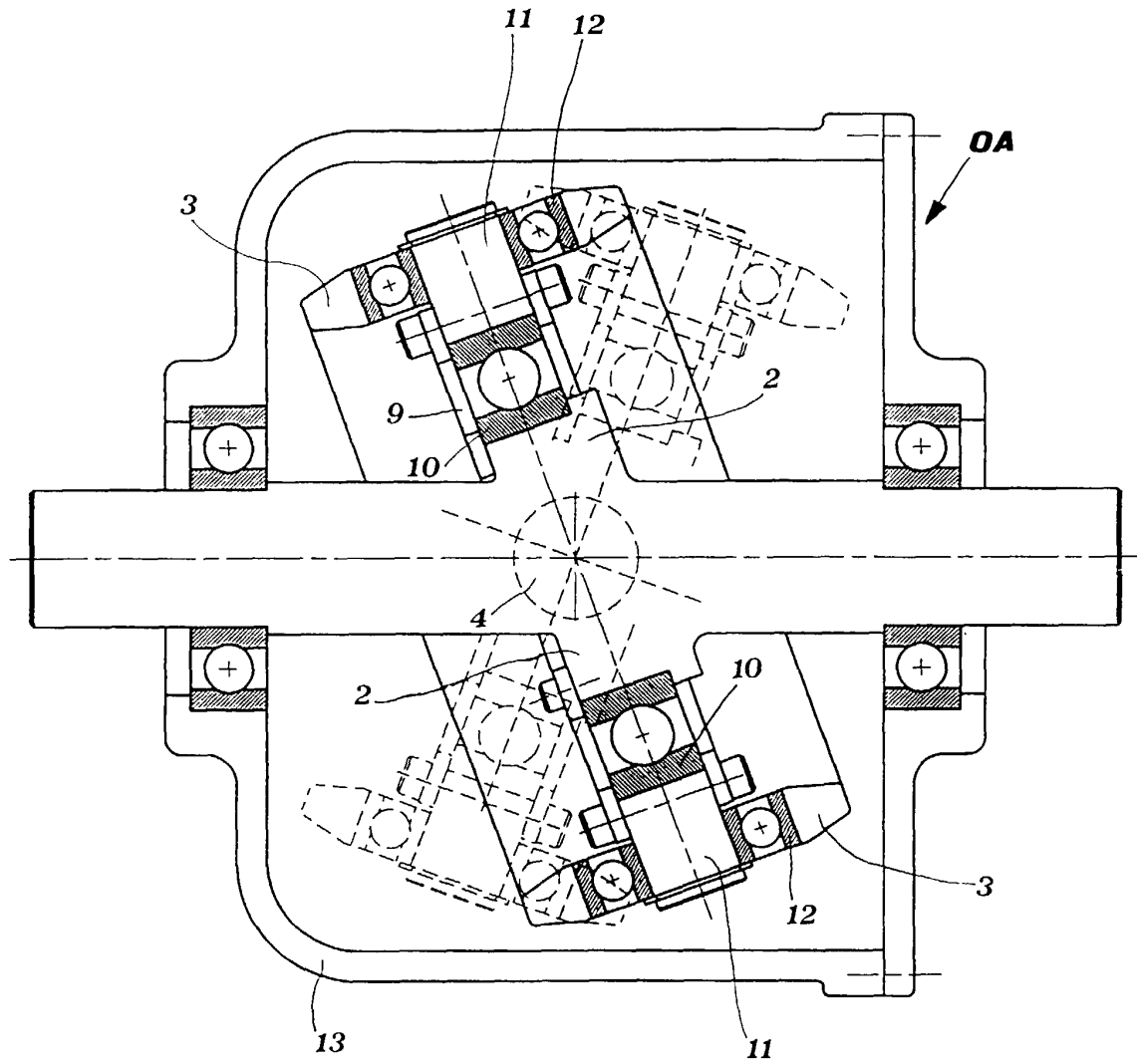


FIG.3

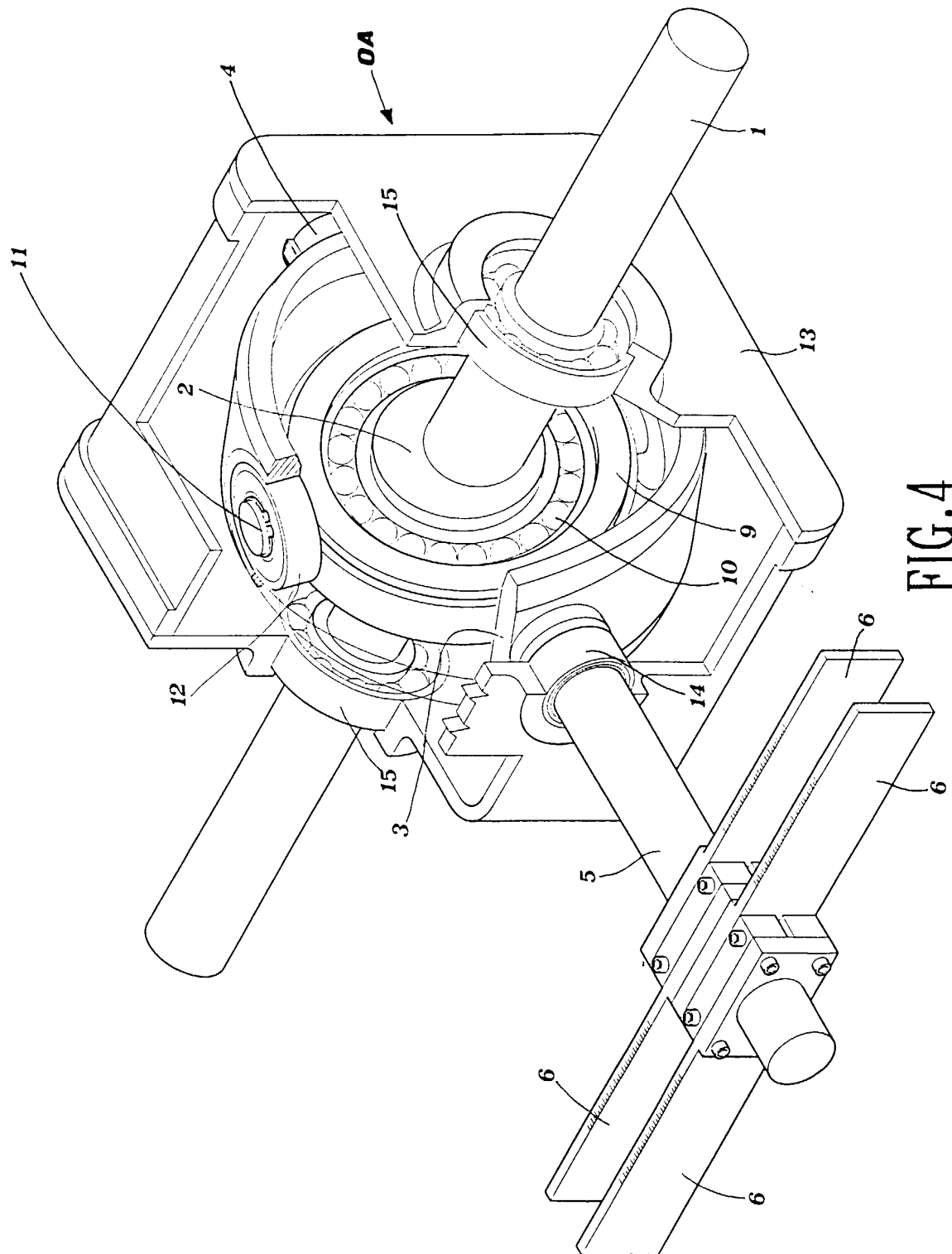


FIG. 4