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(54) **PROCESS AND DEVICE FOR SUPPORTING BARS DURING THE MANUFACTURE OF REINFORCEMENT METAL CAGES**

VERFAHREN UND VORRICHTUNG ZUM STÜTZEN VON LÄNGSSTÄBEN BEI DER HERSTELLUNG VON BEWEHRUNGSELEMENTEN

DISPOSITIF ET PROCÉDÉ DE SUPPORT DE BARRES LONGITUDINALES DURANT LA FABRICATION DE CAGES D'ARMATURE METALLIQUES

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**EP-A1- 0 035 477 WO-A1-2009/104157
JP-A- 7 144 243 US-A- 2 861 602**

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Description

Technical Field

[0001] The present invention regards a device for supporting longitudinal bars in machines for manufacturing metal cages, in particular for reinforced concrete.

Background Art

[0002] It is known that in order to make the reinforcement of piles, reinforced concrete pillars and the like, metal cages are used, often cylindrical shaped, constituted by a series of longitudinal iron bars, outside which is placed a rod spiral-wound on the same bars, according to a suitably predetermined pitch. The longitudinal bars are distributed according to a suitable geometrical profile, usually cylindrical; nevertheless examples of piles and pillars having different geometries are not lacking, for example asymmetrical, elliptic, prismatic and the like.

[0003] Nowadays, machines that enable to seal the spiral on the longitudinal bars, prearranged according to the desired geometrical profile, are used to manufacture such metal cages. As an example, patent EP 0035477 illustrates a machine for manufacturing cages with spiral-winding comprising a driving flange and a freely sliding flange carried by a trolley which can move in front of the driving head, both flanges being prearranged to support the longitudinal bars in predetermined positions. To shape the cage, the bars are rotated by the aforesaid flanges, while the metal wire, unwound from a lateral coil and brought in longitudinal motion, progressively spiral-winds about the same bars.

[0004] In the machines of the cited type various solutions for the support of the bars on the rotating members have been proposed, substantially allowing to arrange the bars in different positions and in particular at different radial distances with respect to the cage forming axis.

[0005] For example patent IT 1216960 discloses the use of rotating members constituted by disks provided with holes arranged at various radial distances from the cage forming longitudinal axis, coinciding with the machine rotation axis, for the insertion of the longitudinal bars. The longitudinal bars are associated with the aforementioned holes of the rotating members by means of suitable sleeves.

[0006] Patent US 3, 579, 259 illustrates an analogous support system for the bars wherein the rotating members are constituted by disks having a series of radial eyelets, regularly distanced, designed to be engaged by the longitudinal bars. The bars are fastened in the desired position by means of suitable blocking members. The support system for the bars illustrated in patent WO 2005/084848 (with family the patent publication IT UD2004 0095) belongs to the same typology.

[0007] Patent publication ITPS20010012 illustrates a different support modality for the longitudinal bars wherein the rotating members are provided with an inter-

changeable ring on which the bar insertion sleeves can be applied, in different positions.

[0008] Patent publication JP 07-144243 discloses a device for the production of X-shaped bar arrangement assembly, comprising a pair of carriages movable so as to get mutually distanced or approached. Each carriage carries a rotary shaft parallel to the carriage moving direction and provided with a rotating body. Such rotating bodies each provide a gage plate having penetrating hole for positioning the end of a bar, and a cross shaped element to support a reinforcing bar fixing frame on the side of the front end of the rotary shaft.

[0009] Patent US 2, 861, 602 teaches a collapsible mandrel for manufacturing reinforcing cages, comprising a central shaft, a plurality of elongated U-shaped elongated bars parallel to the central shaft, and a plurality of further U-shaped elongated bars which act as sleeves for receiving the longitudinal bars of the reinforcing cages being manufactured.

[0010] In the specified field, the need is felt for manufacturing cages with longitudinal bars having a suitably folded end. The use of cages of this type is required, for example, to better distribute the weight of the cage, or to prevent a sinking of the same cage in the ground, due to its own weight, which would enable harmful corrosion phenomena. Furthermore the use of bars with the folded end is useful for safety reasons, to prevent accidental injuries of the operators on the sharp ends protruding from the bars.

[0011] Yet, the currently known machines do not enable the use of longitudinal bars with the folded end. It is in fact impossible to mount such longitudinal bars on the rotatable support members in use in the known machines.

Disclosure of invention

[0012] The task of the present invention is that of solving the aforementioned problem, devising a method and a device that allow to operate in an optimal way the support of the longitudinal bars in machines for manufacturing metal cages for reinforced concrete and the like, in particular enabling the mounting of bars having at least one folded end.

[0013] In the framework of such a task, a further scope of the present invention is that of providing a device that allows to orient in the desired manner the aforesaid folded end of the longitudinal bars.

[0014] A further object of the invention is that of devising a support device for bars having a simple conception, a securely reliable functioning and versatile use, as well as relatively economic cost.

[0015] The above mentioned scopes are attained, according to the present invention, by the support device for bars in machines for manufacturing metal cages according to claim 1 and the method according to claim 9.

Brief Description of the Drawings

[0016] Details of the invention shall be more apparent from the detailed description of a preferred embodiment of the support device for bars in machines for manufacturing metal cages, illustrated for indicative purposes in the attached drawings, wherein:

figures 1 and 2 respectively show a prospective view, from various angulations, of the support device for bars according to the present invention;

figures 3 and 4 respectively show a prospective view, from various angulations, of a detail of the device in hand;

figures 5 and 6 respectively show a prospective view, from various angulations, of a different embodiment of the same device.

Best Modes of Carrying Out the Invention

[0017] With particular reference to such figures, the support device for longitudinal bars 2 in a machine for manufacturing metal cages, in particular for the reinforcement of piles, reinforced concrete pillars and the like, is indicated in its entirety with 1. In particular, the bars 2 have a suitable folded end 20.

[0018] As described and illustrated in patent publication ITBO20070828, the metal cage to be manufactured is constituted by a series of longitudinal bars arranged parallel and made integral, according to the predetermined geometry, by means of a metal wire spiral-wound on the same bars, according to a suitable predetermined pitch. In particular it is provided that the bars suitable to shape the metal cage are arranged according to a circular transverse profile, so as to determine the manufacturing of a cylindrical pile. Obviously it is possible to provide the manufacturing of cages having a different transverse profile, for example elliptic, polygonal, with asymmetrical distribution of the bars or the like. The support device 1 provides a rotating member 3 suitable to support the longitudinal bars 2 in the fastening positions for the formation of the cage. Such a rotatable support member 3 is suitable to be actuated in rotation by a suitable motor member, according to the axis of the forming cage, in order to put in rotation the longitudinal bars 2 during the formation of the cage.

[0019] According to the embodiment illustrated in figures 1 and 2, the rotatable support member 3 comprises a disk 30 suitable to be arranged on a plane orthogonal to the cited axis of the forming cage. The disk 30 has a series of slots 31 extended in radial direction and angularly distributed in a regular manner.

[0020] The disk 30 is suitable to carry, at the slots 31, a plurality of bushings or sleeves 4 suitable to receive the longitudinal bars 2. The sleeves 4 are suitable to be fastened in adjustable positions respectively at the radial slots 31 of the disk 30, through respective connection members 5.

[0021] According to the present invention, the sleeves 4 are made from a first element 41 and a second element 42 having a complementary shape, suitable to be associated with each other in a way as to conjointly define, in the position of reciprocal union, a tubular opening 40 for the passage of the bar 2 to be supported.

[0022] As can be seen in detail in figures 3 and 4, such first and second element 41, 42 of the sleeves 4 are constituted for example by trolley-shaped prismatic bodies, respectively having a first channel 43 and a second channel 44. In the illustrated case, the channels 43, 44 have equal semicircular profile in a way as to constitute, in the position of reciprocal union of the elements 41 and 42, a cylindrical tubular opening 40. Nevertheless it is possible to provide that the channels 43, 44 to have a different shape, so as to define a tubular opening for the passage of the bar 2 with a different profile, as an example prismatic. It is also possible that the channels 43, 44 are made differently from each other or otherwise that the tubular opening for the passage of the bar 2 is made by one only channel, shaped in a first trolley element 41, closed by a covering element made by the second element 42.

[0023] The trolley elements 41, 42 are suitable to be tightened, in the position of reciprocal union, between a couple of plates 45 fastened by means of screw means 46.

[0024] The connection member 5 is constituted by a couple of plates 51, 52 suitable to be vice-tightened on the disk 30 of the rotatable support member 3 through a screw member 50 that crosses in mounting position a relative radial slot 31. A first plate 51 is integral with the first trolley element 41 of the sleeve 4 and rests in mounting position on a side of the disk 30, while the second plate 52 is free and rests in mounting position on the opposite side of the disk 30.

[0025] In figures 5 and 6 is illustrated a different embodiment of the support device according to the invention, wherein the rotatable support member 3 comprises a ring 32 provided with circumferential slots 33. Particularly, such a rotatable support member 3 is of the type illustrated in patent publication WO 2009/104157. As described in such a patent publication, it is possible to provide that the ring 32 is realized by two concentric portions so as to define a continuous circumferential eyelet. The ring 32 is arranged on a plane orthogonal to the axis of the forming cage and is appropriately suitable to be constrained to the motion members by means of cross members not represented. Such a solution offers the advantage of freeing the central zone of the rotatable support member 3, for example for inserting auxiliary devices on the machine.

[0026] The first and the second element 41, 42 of the sleeves 4 are constituted in this case by respective angular pieces, with squaring profile, suitable to be inserted in each other with sliding in longitudinal direction. To such an end, the first element 41 has along the longitudinal edges respective guides 47 suitable to allow the sliding

insertion of the second element 42. The tubular opening 40 for the passage of the bar 2 to be supported has a quadrilateral, in particular square, profile. The second element 42 is then fastened to the first element 41 by means of appropriate screw members.

[0027] The connection member 5 of the first element 41 of the sleeves 4 to the ring 32 of the rotatable support member 3 is constituted by an arm 53 which extends transversely from the element and has a slot 54 that is suitable to be crossed, in mounting position, by a screw member 55 for fastening to the provided circumferential slot 33 of the ring 32. The arm 53 is arranged substantially according to a direction diametral to the piece and is mounted radial to the ring 32.

[0028] The functioning of the device according to the invention turns out to be easy to understand from the preceding description.

[0029] As a function of the diametral dimensions and of the shape of the metal cage to be manufactured, one provides to select the suitable rotatable support member 3. Such a rotatable support member 3 is constrained in a known way to the motion members of the machine, on a plane orthogonal to the axis of the forming cage.

[0030] Then one provides to constrain the first element 41 of the sleeves 4 to the rotatable support member 3 by means of the respective connection member 5. The connection member 5 of the first element 41 of the sleeves 4 is constrained in a predetermined position along a relative radial slot 31 of the disk 30 or circumferential slot 33 of the ring 32. In particular, thanks to the synergy made by the circumferential slot 33 of the ring 32 and by the slot 54 of the arm 53, in use arranged radial to the rotatable support member 3, that is radial to the axis of the forming cage, it is possible to adjust with extreme precision and without strains the circumferential as well as the radial position of the longitudinal bars 2 on the rotatable support member 3. It is to note that the first element 41 of the sleeves 4 can be radially mounted outwards as well as inwards of the ring 32.

[0031] Once fastened the first element 41 of the sleeves 4, one provides to introduce the bar 2 to be supported, arranging it in the channel longitudinally defined by the same element 41. In particular, the bar 2 of the longitudinal reinforcement is more commonly introduced with the folded end 20 arranged frontally. It is to observe that such a folded end 20 of the bar 2 can freely pass, in an introduction step, through the radial slot 31 of the disk 30; obviously the passage is completely free, in case of the use of the ring 32 for the support of the bars 2. One inserts then the second element 42, free, on the first element 41 fastened to the rotatable support member 3, in a way as to re-establish the tubular opening 40 in which the bar 2 is supported during the formation of the cage. The end of the introduced bar 2, straight or folded, is then fastened to the corresponding disk which is keyed on the mobile head of the machine. In an analogous way one proceeds to the mounting of the successive bars 2.

[0032] The described device attains the scope of mak-

ing in an optimal manner the support of the longitudinal bars in machines for manufacturing metal cages for reinforced concrete and the like, in particular enabling the mounting of bars having at least one folded end.

5 [0033] In fact, thanks to the inventive idea of realizing the sleeves 4 through a first element 41 and a second element 42 separated, suitable to be associated with each other after the containing of the bar 2 to be supported, it is possible to arrange the same bar 2 in the tubular opening 40 conjointly defined, in the position of reciprocal union, by the same elements 41, 42, and to allow the passage of the folded end 20 frontally, at the beginning of the working, as well as in a rear position, during the final step of the working.

10 [0034] A characteristic of the device in hand is further constituted by the fact that it enables to rotate the longitudinal bars 2 about their own axis, in mounting step, so as to orient the folded end 20 in the wanted direction, as an example inwards of the cage or outwards as represented in figures 1 and 2. The bars 2 are then blocked in order to maintain the folded end 20 in the wanted position.

15 [0035] It is eventually to observe that the device in hand has a very simple and easy to use structure, to the advantage of the productivity of the machine.

20 [0036] In practice, the embodiment of the invention, the materials used, as well as the shape and dimensions, may vary depending on the requirements.

25 [0037] Should the technical characteristics mentioned in each claim be followed by reference signs, such reference signs were included strictly with the aim of enhancing the understanding the claims and hence they shall not be deemed restrictive in any manner whatsoever on the scope of each element identified for exemplifying purposes by such reference signs.

Claims

40 1. Support device for bars, for machines for manufacturing metal cages, said metal cages being constituted of a series of longitudinal bars (2) arranged according to a predetermined geometric profile and made integral by means of at least a metal wire, spiral-wound on the same bars (2) through the combination of a rotation movement about an axis coinciding with the axis of the forming cage and a shifting movement,
45 **characterized in that** said support device comprises

- a rotatable support member (3) suitable to support said longitudinal bars (2) in a fastening position for forming said cage, said rotatable support member (3) having free passage zones allowing insertion of longitudinal bars (2) with possibly folded ends therethrough;
- a plurality of sleeves (4) suitable to receive said

- longitudinal bars (2), each sleeve (4) comprising respectively a first element (41) having a first longitudinal channel (43), and a second element (42) having a second longitudinal channel (44), said first and second longitudinal channels (43, 44) being suitable to form the tubular path of said sleeve (4) when conjointly associated; wherein
- said first element (41) is suitable to be fastened in adjustable position on said rotatable support member (3) by means of a connection member (5).
2. Device according to claim 1, **characterized in that** said first and second elements (41, 42) of the sleeves (4) are constituted by respective angular pieces, suitable to be engaged into each other sliding in longitudinal direction.
 3. Device according to claim 2, **characterized in that** said angular pieces have squaring profile so as to shape a tubular opening (40) for passing said bar (2) with quadrilateral profile.
 4. Device according to claim 2, **characterized in that** said first element (41) of the sleeves (4) has respective guides (47) along the longitudinal edges suitable to allow the sliding engagement of said second element (42).
 5. Device according to claim 1, **characterized in that** said first and second elements (41, 42) of the sleeves (4) are constituted by drawer shaped prismatic bodies, having respectively a first and second semicircular profiled channel (43, 44) in order to conjointly define a cylindrical tubular opening (40) for the passage of the bar (2) to be supported.
 6. Device according to claim 1, **characterized in that** said rotating support member (3) comprises a disk (30) suitable to be arranged on a plane orthogonal to the said axis of the forming cage and having a series of slots (31) which extend radially for fastening in adjustable position said first element (41) of the sleeves (4).
 7. Device according to claim 1, **characterized in that** said rotatable support member (3) comprises a ring (32) provided with at least a circumferential slot (33) for fastening in adjustable position said first element (41) of the sleeves (4).
 8. Device according to claim 7, **characterized in that** said fastening member (5) of the first element (41) of the sleeves (4) comprises an arm (53) extending transversally to the same first element (41) and having a slot (54) which is suitable to be passed through by screw means (55) for fastening said arm (53) to said circumferential slot (33) of the ring (32) in a position substantially radial to the same ring (32), in order to allow the adjustment of the circumferential as well as radial positioning of said longitudinal bars (2) on said rotating support member (3).
 9. Method for mounting longitudinal bars in machines for manufacturing metal cages, said metal cages being constituted by a series of said longitudinal bars (2), arranged according to a predetermined geometric profile and made integral by means of at least a metal wire, spiral-wound on the same longitudinal bars (2) through the combination of a rotation movement about an axis coinciding with the axis of the forming cage and a shifting movement, **characterized in that** it comprises the steps of
 - a. providing a rotatable support member (3) suitable to support said longitudinal bars (2) in a fastening position for forming said cage, said rotatable support member (3) having free passage zones allowing insertion of longitudinal bars with possibly folded ends therethrough;
 - b. providing a plurality of sleeves (4), each sleeve (4) comprising respectively a first element (41) having a first longitudinal channel (43), and a second element (42) having a second longitudinal channel (44), said first and second longitudinal channels (43, 44) forming the tubular path of said sleeve when conjointly associated;
 - c. constraining one said first sleeve elements (41) in adjustable position on said rotatable support member (3);
 - d. inserting a respective longitudinal bar (2) through a free passage zone of said rotating support member (3), with a possibly folded end (20) arranged frontally and arranging said longitudinal bar (2) in said first channel (43) of said first sleeve element (41) fastened on said rotatable support member (3);
 - e. associating said second element (42) to said first element (41) to close said tubular path and contain said bar (2) inserted in said rotatable support member (3);
 - f. constraining in an analogous way to said rotating support member (3) the other sleeves (4).

Patentansprüche

1. Vorrichtung zum Tragen der Stäbe für Maschinen zum Herstellen von Metallkörben, wobei diese Metallkörbe aus einer Reihe von Längsstäben (2) bestehen, die gemäß einem vorbestimmten geometrischen Profil angeordnet und mit Hilfe von mindestens einem Metalledraht fest miteinander verbunden sind, der mittels der Kombination einer Drehbewe-

gung um eine mit der Achse des in Entstehung befindlichen Korbs übereinstimmende Achse und einer Verschiebewegung spiralförmig um die Stäbe (2) gewunden wird, **dadurch gekennzeichnet, dass** diese Tragvorrichtung Folgendes umfasst:

- ein drehbares Tragelement (3), das geeignet ist, die Längsstäbe (2) in einer Befestigungsposition abzustützen, um den Korb zu bilden, wobei dieses drehbare Tragelement (3) Bereiche für den freien Durchgang aufweist, die das Einführen von Längsstäben (2) mit nach Möglichkeit gebogenen Enden ermöglichen,
- eine Vielzahl von Muffen (4), die geeignet sind, die Längsstäbe (2) aufzunehmen, wobei jede Muffe (4) jeweils ein erstes Element (41), das einen ersten Längskanal (43) aufweist, und ein zweites Element (42) umfasst, das einen zweiten Längskanal (44) aufweist, wobei der erste und der zweite Durchgangslängskanal (43, 44) geeignet sind, den röhrenförmigen Raum dieser Muffe (4) zu bilden, wenn sie miteinander zusammengefügt sind; wobei das erste Element (41) mit Hilfe eines Anschlusselements (5) in einer verstellbaren Position am drehbaren Tragelement (3) befestigt werden kann.
2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** das erste und das zweite Element (41, 42) der Muffen (4) aus jeweiligen Winkelprofilen bestehen, die durch eine Verschiebung in Längsrichtung ineinander gesteckt werden können.
3. Vorrichtung nach Anspruch 2, **dadurch gekennzeichnet, dass** die Winkelprofile ein quadratisches Profil haben, so dass sie einen röhrenförmigen Raum (40) für den Durchgang des Stabs (2) mit einem Viereckprofil bilden.
4. Vorrichtung nach Anspruch 2, **dadurch gekennzeichnet, dass** das erste Element (41) der Muffen (4) entlang der Längskanten jeweilige Führungen (47) aufweist, die das Einschieben des zweiten Elements (42) ermöglichen können.
5. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** das erste und das zweite Element (41, 42) der Muffen (4) aus schieberförmigen prismatischen Körpern bestehen, die jeweils einen ersten und einen zweiten Kanal (43, 44) mit halbkreisförmigem Profil aufweisen, um gemeinsam einen zylindrischen röhrenförmigen Raum (40) für den Durchgang des zu tragenden Stabs (2) zu definieren.
6. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** das Drehtragelement (3) eine Scheibe (30) umfasst, die in einer zur Achse des in Entstehung befindlichen Korbs rechtwinkligen Ebene

angeordnet sein kann und eine Reihe von sich in radialer Richtung erstreckenden Langlöchern (31) für die Befestigung des ersten Elements (41) der Muffen (4) in einer verstellbaren Position aufweist.

7. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** das drehbare Tragelement (3) einen Ring (32) umfasst, der mit mindestens einem zirkumferenziellen Langloch (33) für die Befestigung des ersten Elements (41) der Muffen (4) in einer verstellbaren Position versehen ist.
8. Vorrichtung nach Anspruch 7, **dadurch gekennzeichnet, dass** das Anschlusselement (5) des ersten Elements (41) der Muffen (4) einen Ausleger (53) umfasst, der sich quer zum diesem ersten Element (41) erstreckt und ein Langloch (54) aufweist, das von schraubenartigen Mitteln (55) zum Befestigen dieses Auslegers (53) an dem zirkumferenziellen Langloch (33) des Rings (32) in einer im Wesentlichen zum Ring (32) radialen Position durchquert werden kann, um die Einstellung der sowohl zirkumferenziellen als auch radialen Positionierung der Längsstäbe (2) auf dem drehbaren Tragelement (3) zu ermöglichen.
9. Verfahren zum Montieren von Längsstäben in Maschinen zum Herstellen von Metallkörben, wobei diese Metallkörbe aus einer Reihe von Längsstäben (2) bestehen, die gemäß einem vorbestimmten geometrischen Profil angeordnet und mit Hilfe von mindestens einem Metalldraht fest miteinander verbunden sind, der mittels der Kombination einer Drehbewegung um eine mit der Achse des in Entstehung befindlichen Korbs übereinstimmende Achse und einer Verschiebewegung spiralförmig um die Stäbe (2) gewunden wird, **dadurch gekennzeichnet, dass** es die folgenden Phasen umfasst:
 - a. Bereitstellen eines drehbaren Tragelements (3), das geeignet ist, die Längsstäbe (2) in einer Befestigungsposition abzustützen, um den Korb zu bilden, wobei dieses drehbare Tragelement (3) Bereiche für den freien Durchgang aufweist, die das Einführen von Längsstäben (2) mit nach Möglichkeit gebogenen Enden ermöglichen;
 - b. Bereitstellen einer Vielzahl von Muffen (4), wobei jede Muffe (4) jeweils ein erstes Element (41), das einen ersten Längskanal (43) aufweist, und ein zweites Element (42) umfasst, das einen zweiten Längskanal (44) aufweist, wobei der erste und der zweite Durchgangslängskanal (43, 44) den röhrenförmigen Raum dieser Muffe (4) bilden, wenn sie miteinander zusammengefügt sind;
 - c. Fixieren eines ersten Elements (41) der Muffe in einer verstellbaren Position auf dem drehbaren Tragelement (3);

d. Introduire un correspondant longitudinal (2) par une zone pour le libre passage du support (3) avec une extrémité ordonnée éventuellement courbée (20) et
 Anordner des Longitudinal (2) im ersten Kanal (43) des ersten Elements (41) der Muffe, die auf dem drehbarem Tragelement (3) befestigt ist;
 e. Verbinden des zweiten Elements (42) mit dem ersten Element (41) zum Schließen des röhrenförmigen Raums und zum Halten des in das drehbare Tragelement (3) eingeführten Stabs (2);
 f. Fixieren der anderen Muffen (4) in analoger Weise am Drehtragelement (3).

Revendications

1. Dispositif de support de barres, pour des machines pour la réalisation de cages métalliques, lesdites cages étant constituées d'une série de barres longitudinales (2) disposées selon un profil géométrique prédéterminé et rendues solidaires au moyen d'au moins un fil métallique, enroulé en spirale sur les mêmes barres (2) à travers la combinaison d'un mouvement de rotation autour d'un axe coïncidant avec l'axe de la cage en formation et un mouvement de translation, **caractérisé en ce que** ledit dispositif de support comprend un membre de support rotatif (3) propre à supporter lesdites barres longitudinales (2) dans une position de fixation pour la formation de ladite cage, ledit membre de support rotatif (3) présentant des zones de passage libre qui permettent l'insertion de barres longitudinales (2) avec l'extrémité éventuellement pliée ;
 une pluralité de manchons (4) propres à recevoir lesdites barres longitudinales (2), chaque manchon (4) comprenant respectivement un premier élément (41) ayant un premier canal longitudinal (43), et un second élément (42) ayant un second canal longitudinal (44), lesdits premier et second canaux (43, 44) étant propres à former le passage tubulaire dudit manchon (4) une fois associés de façon conjointe ; dans lesquels
 ledit premier élément (41) est propre à être fixé en position ajustable sur ledit membre de support rotatif (3) au moyen d'un membre de connexion (5).
2. Dispositif selon la revendication 1, **caractérisé en ce que** lesdits premier et second éléments (41, 42) des manchons (4) consistent en des pièces angulaires respectives, propres à être engagées coulissant l'une dans l'autre en direction longitudinale.
3. Dispositif selon la revendication 2, **caractérisé en ce que** lesdites pièces angulaires ont un profil à angle droit de façon à former une ouverture tubulaire

(40) pour le passage de ladite barre (2) avec un profil quadrilatéral.

4. Dispositif selon la revendication 2, **caractérisé en ce que** ledit premier élément (41) des manchons (4) présente des guides (47) respectifs le long des bords longitudinaux propres à permettre l'engagement coulissant dudit second élément (42).
5. Dispositif selon la revendication 1, **caractérisé en ce que** lesdits premier et second éléments (41, 42) des manchons (4) consistent en des corps prismatiques formant tiroir, ayant respectivement un premier et un second canal (43, 44) à profil semi-circulaire pour définir conjointement une ouverture tubulaire cylindrique (40) pour le passage de la barre (2) à supporter.
6. Dispositif selon la revendication 1, **caractérisé en ce que** ledit membre de support rotatif (3) comprend un disque (30) propre à être disposé sur un plan orthogonal audit axe de la cage en formation et présentant une série de fentes (31) qui s'étendent radialement pour la fixation en position ajustable dudit premier élément (41) des manchons (4).
7. Dispositif selon la revendication 1, **caractérisé en ce que** ledit membre de support rotatif (3) comprend un anneau (32) pourvu d'au moins une fente circumférentielle (33) pour la fixation en position ajustable dudit premier élément (41) des manchons (4).
8. Dispositif selon la revendication 7, **caractérisé en ce que** ledit membre de fixation (5) du premier élément (41) des manchons (4) comprend un bras (53) qui s'étend transversalement par rapport au même premier élément (41) et ayant une fente (54) qui est propre à être traversée par des moyens à vis (55) pour la fixation dudit bras (53) à ladite fente circumférentielle (33) de l'anneau (32) dans une position essentiellement radiale par rapport au même anneau (32), pour permettre d'ajuster le positionnement aussi bien circumférentiel que radial desdites barres longitudinales (2) sur ledit membre de support rotatif (3).
9. Méthode pour le montage de barres longitudinales dans des machines pour la réalisation de cages métalliques, lesdites cages métalliques étant constituées d'une série de dites barres longitudinales (2), disposées selon un profil géométrique prédéterminé et rendues solidaires au moyen d'au moins un fil métallique, enroulé en spirale sur les mêmes barres longitudinales (2) à travers la combinaison d'un mouvement de rotation autour d'un axe coïncidant avec l'axe de la cage en formation et un mouvement de translation, **caractérisée en ce qu'elle** prévoit les étapes de

- a. prédisposer un membre de support rotatif (3) propre à supporter lesdites barres longitudinales (2) dans une position de fixation pour la formation de ladite cage, ledit membre de support rotatif (3) présentant des zones de passage libre permettant l'insertion de barres longitudinales avec extrémité éventuellement pliée ; 5
- b. prédisposer une pluralité de manchons (4), chaque manchon (4) comprenant respectivement un premier élément (41) ayant un premier canal longitudinal (43), et un second élément (42) ayant un second canal longitudinal (44), lesdits premier et second canaux longitudinaux (43, 44) formant le passage tubulaire dudit manchon une fois associés de façon conjointe ; 10 15
- c. contraindre un dit premier élément (41) du manchon en position ajustable sur ledit membre de support rotatif (3) ;
- d. insérer une barre longitudinale (2) respective à travers une zone de passage libre dudit membre de support rotatif (3), avec une extrémité éventuellement pliée (20) disposée frontalement et 20
- disposer ladite barre longitudinale (2) dans ledit premier canal (43) dudit premier élément (41) du manchon fixé sur ledit membre de support rotatif (3) ; 25
- e. associer ledit second élément (42) audit premier élément (41) pour fermer ledit passage tubulaire et contenir ladite barre (2) insérée dans ledit membre de support rotatif (3) ; 30
- f. contraindre de façon analogue audit membre de support rotatif (3) les autres manchons (4).

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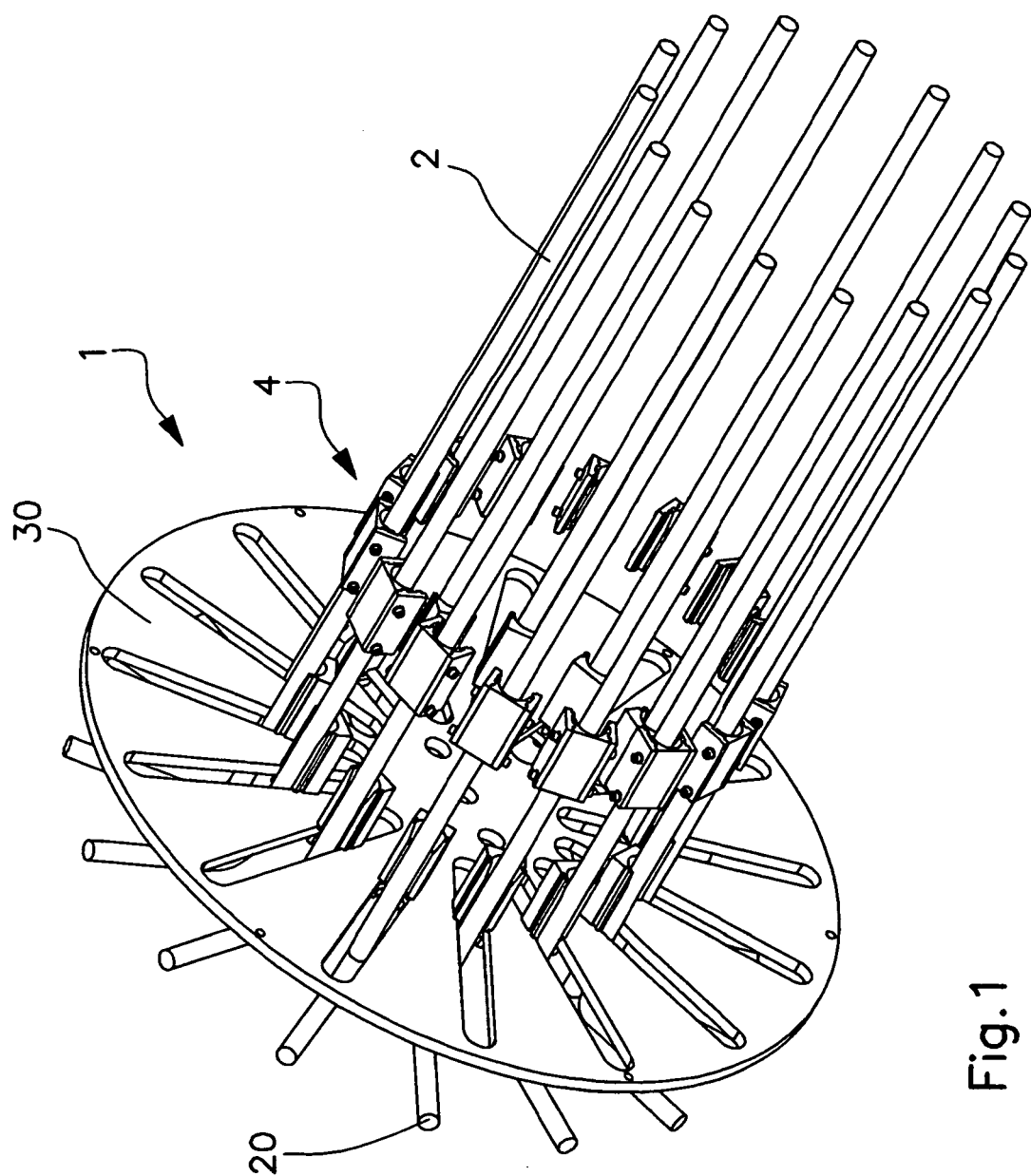


Fig. 1

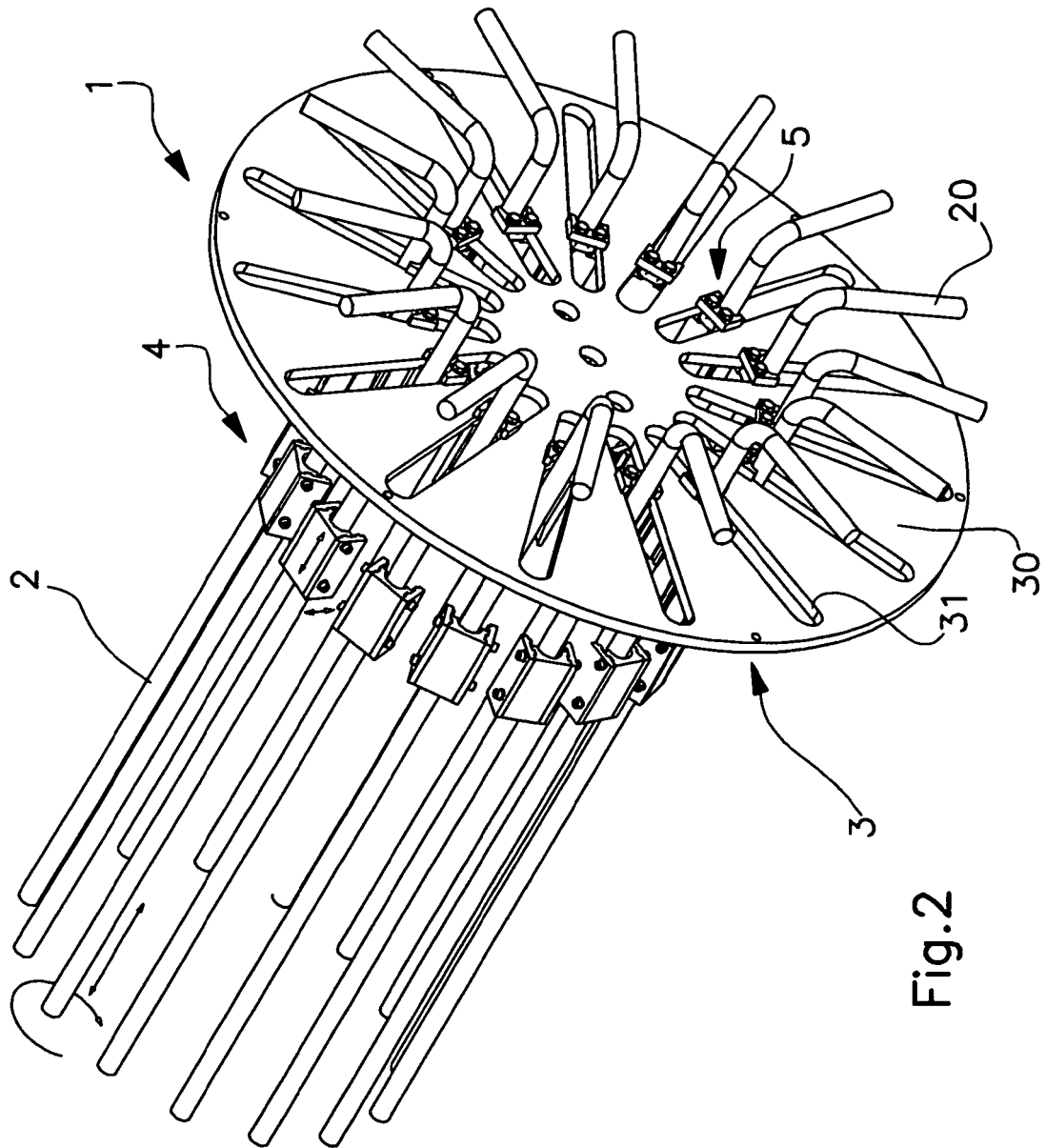


Fig. 2

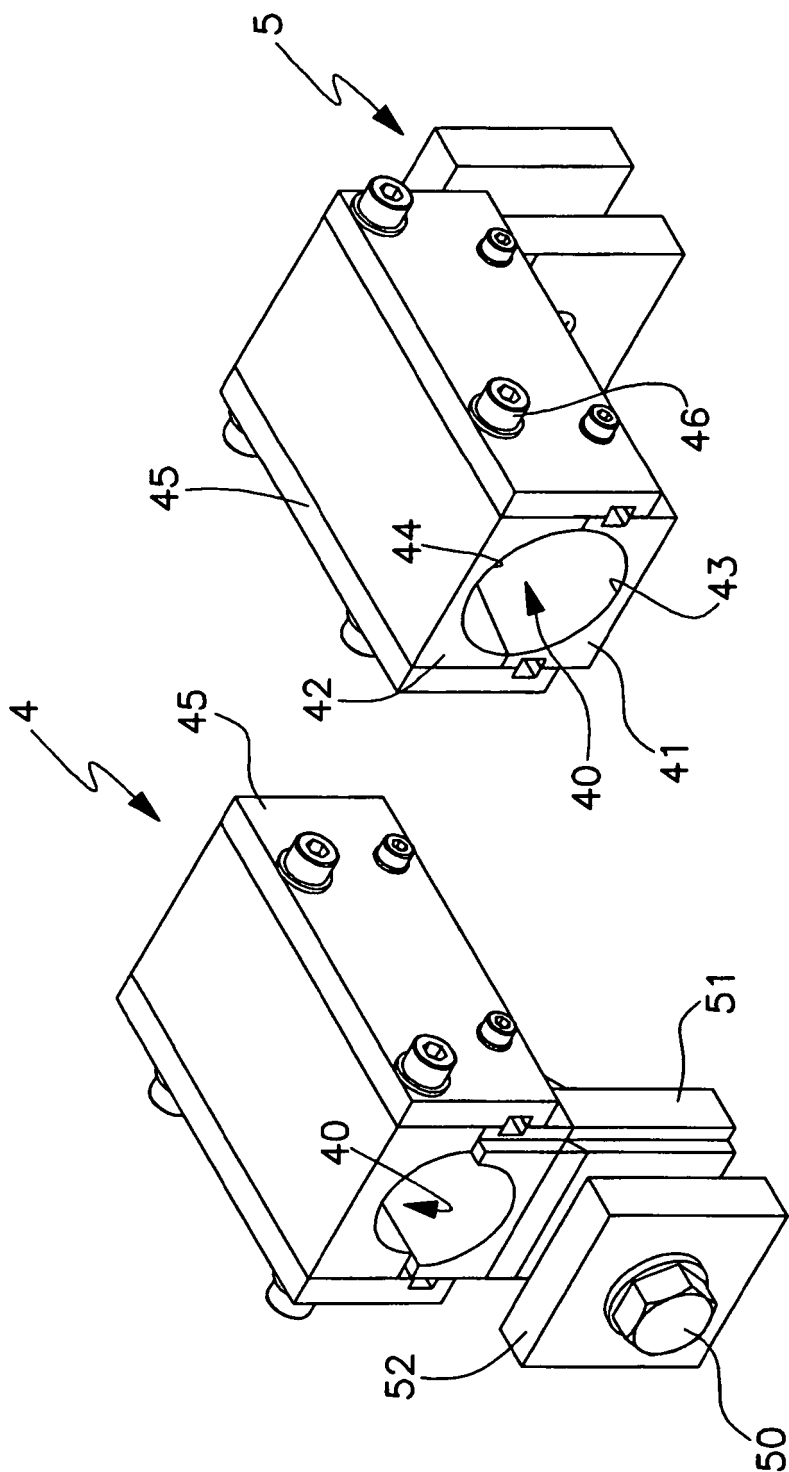


Fig. 4

Fig. 3

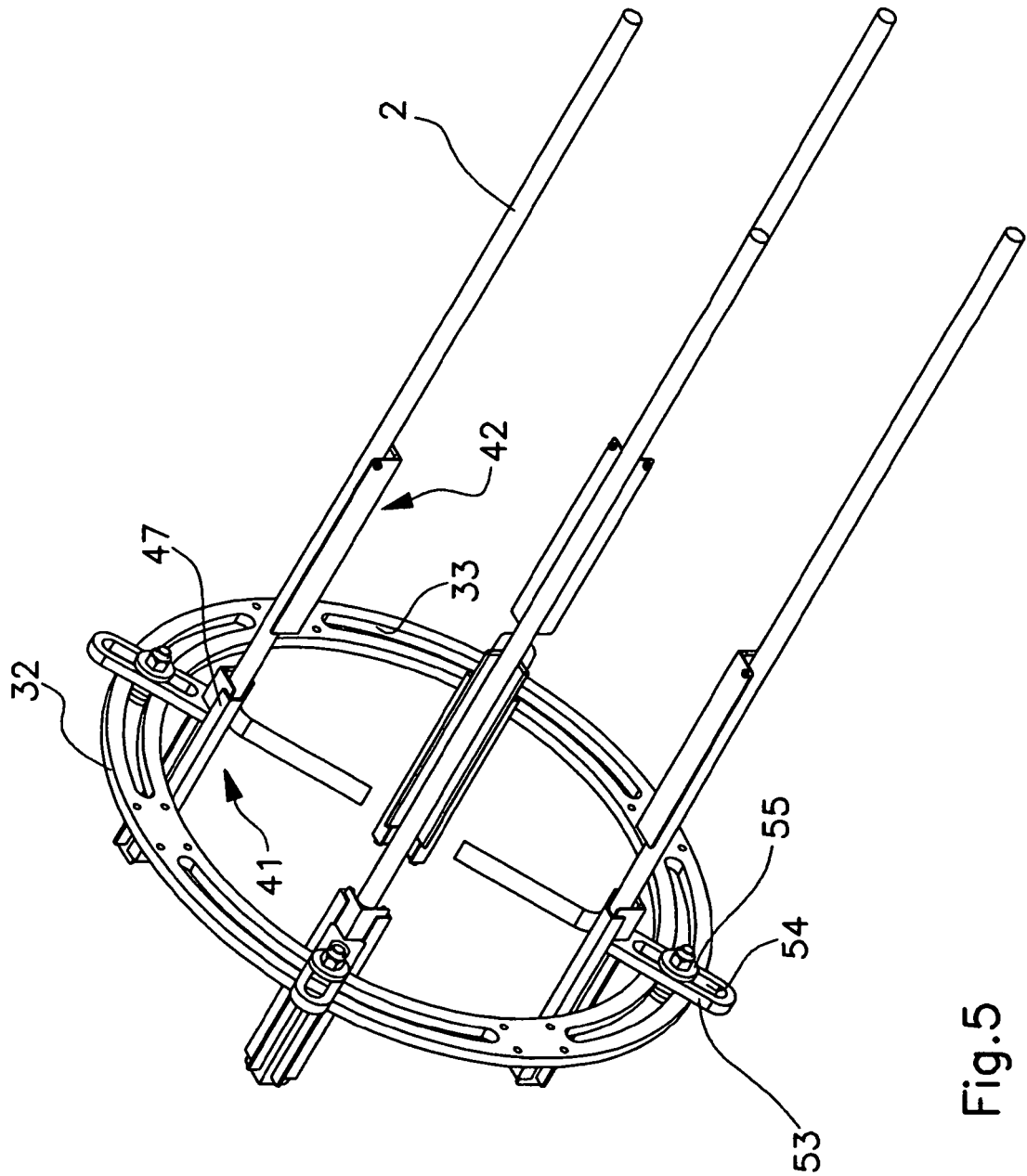


Fig.5

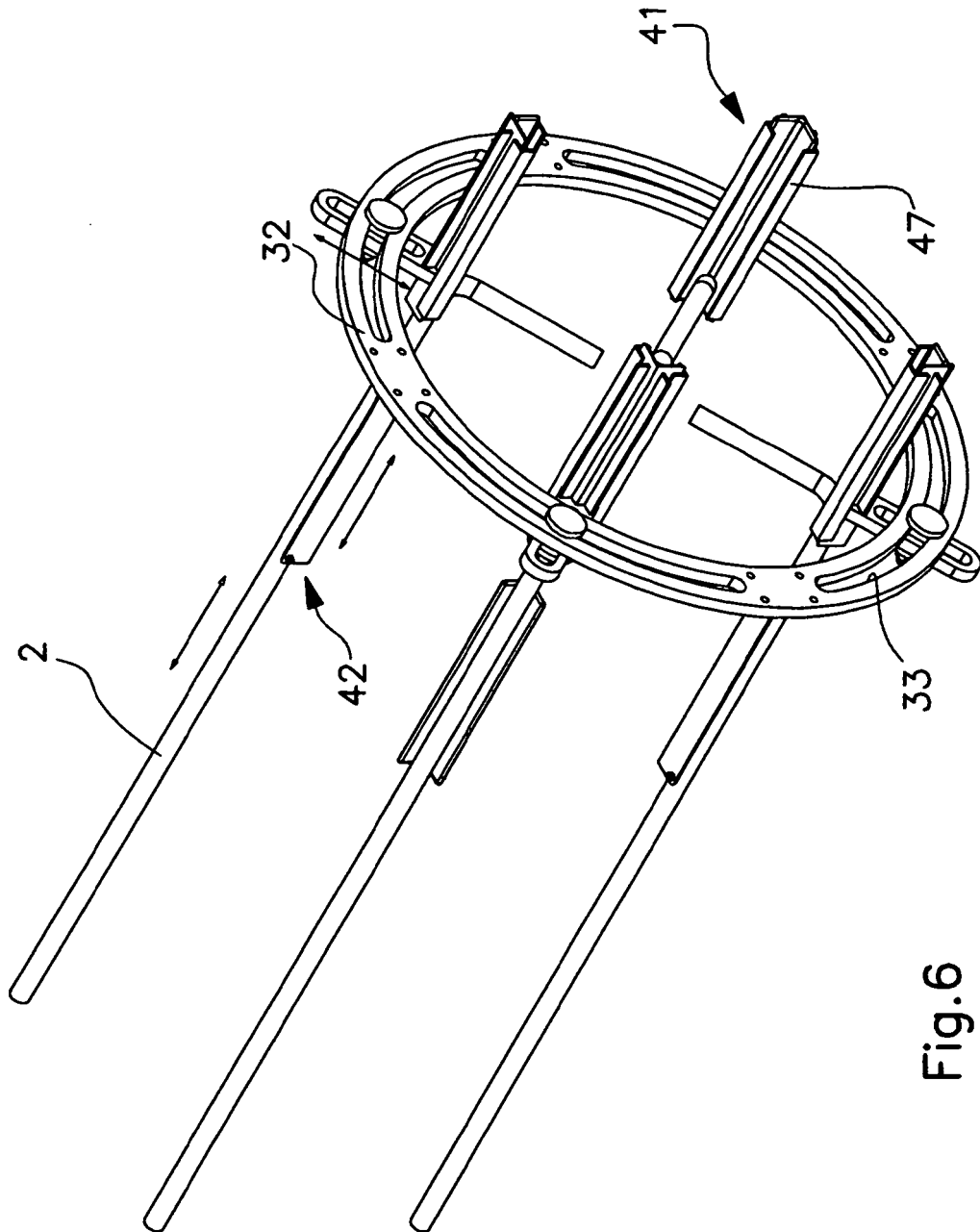


Fig. 6

REFERENCES CITED IN THE DESCRIPTION

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