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(54) STABILIZING GROUP FOR A TOWER CRANE AND TOWER CRANE COMPRISING SUCH A GROUP

STABILISIERUNGSGRUPPE FÜR EINEN TURMKRAN UND TURMKRAN MIT SOLCH EINER GRUPPE

GROUPE DE STABILISATION POUR UNE GRUE À PYLÔNE ET GRUE À PYLÔNE COMPRENANT UN TEL GROUPE

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EP 3 045 417 B1

Description

[0001] The present invention refers to a stabilizing group for a tower crane and to a tower crane comprising such a group, particularly but not exclusively able to be used in the building sector.

[0002] As known, tower cranes are jib lifting apparatuses comprising a vertical tower structure at the top of which a rotary group is mounted, constrained at one side to a lifting arm or jib and at the other side to a counter jib.

[0003] In addition, cranes are provided with a complex system of motorised members and ropes for lifting, lowering and moving suspended loads.

[0004] In detail, a translating trolley is mounted on the lifting arm, said trolley carrying a block supported by a rope for lifting loads; the trolley is normally moved thanks to the action of a moving rope that winds or unwinds on a trolley winch also mounted on the lifting arm. A counterweight and a hoisting winch about which the lifting rope winds or unwinds are mounted on the opposite side to the arm, on the counter jib.

[0005] Tower cranes can, in general, be installed in fixed positions or equipped with sliding and/or elevation means.

[0006] In such cases, the vertical tower structure is constrained to a base structure that can consist of a trunk or of a plurality of foundation legs, generally four, or a fixed or translating base.

[0007] In any case, generally, tower cranes arrive at the building yard already partially preassembled so as to be able to be mounted on site through the use of crane truck or other suitable apparatuses.

[0008] The greater the degree of preassembly with which such cranes arrive at the building yard, the quicker the mounting times.

[0009] However, in the preassembly phase, it is necessary to take into account the weights of the various components since the heavier and bulkier the single preassembled groups are, the more complex is their transport and the more expensive and difficult to be retrieved are the lifting and mounting means and apparatuses, like for example large-sized crane truck.

[0010] Generally, the on-site mounting procedure of tower cranes that are currently known provides an initial step in which the base structure is pre-arranged and in which the modular elements adapted for forming the trestle of the tower structure are assembled; thereafter, the so-called stabilizing group, generally made up of the rotary group and the counter jib on which a hoisting winch is possibly constrained, is fixed to such a structure. Finally, the lifting arm is fixed to the stabilizing group and, in particular, to the rotary group.

[0011] In particular, essentially two types of stabilizing groups are currently known.

[0012] According to a first type, the counter jib is stably constrained to the rotary group so as to become integral with it.

[0013] This solution has as a strength point the possibility of providing the stabilizing group already ready with the lifting rope prearranged on the trolley and on the block which are in turn installed on holding arms applied to the rotary group.

[0014] However, such a stabilizing group has high constructive complexity, as well as substantial weight and bulk that make it difficult to move. Moreover, this stabilizing group is subjected alternately to compression and traction forces that can limit its durability.

[0015] According to a second type, the counter jib is constrained to the rotary group so as to rotate about a hinge having a substantially horizontal axis.

[0016] In this case, the stabilizing group is provided with a system of tie rods adapted for keeping the counter jib raised in a direction substantially perpendicular to the direction of extension of the tower structure.

[0017] In particular, during the normal use of the crane, the counter jib is kept inclined upwards according to an angle greater than zero with respect to the hinging plane, so as to be able to compensate for the deflection of the tower.

[0018] A stabilizing group of the aforementioned second type, despite having a lower weight with respect to groups of the first type, can, however, suffers from some drawbacks during transportation to the building yard.

[0019] In order to make the transport to the building yard easier, the crane and, in particular, the stabilizing group are delivered in distinct parts that must be assembled at the building yard, which means an increase in mounting times and possibly the need to mount many pieces at great height. CN 203 998 737 U discloses a stabilizing group according to the preamble of claim 1. The term "mount at great height" is meant to indicate the group of the operations that workers must perform with the help of the crane truck at the final mounting height, for example 50 metres from the ground.

[0020] The purpose of the present invention is to avoid the aforementioned drawbacks and, in particular, to devise a stabilizing group for a tower crane that is simpler to transport and to mount on the tower structure with respect to known stabilizing groups.

[0021] Another purpose of the present invention is to provide a tower crane the mounting of which is simple and inexpensive.

[0022] These and other purposes according to the present invention are accomplished by making a stabilizing group for a tower crane and a tower crane as outlined in claims 1 and 8. Further characteristics of the stabilizing group for a tower crane and of the tower crane are the object of the dependent claims.

[0023] The characteristics and advantages of a stabilizing group for a tower crane and of a tower crane according to the present invention will become clearer from the following description, given as an example and not for limiting purposes, referring to the attached schematic drawings, in which:

- figure 1 is a schematic side view of a stabilizing group

for a tower crane according to the present invention that has a triangular bracket element in folded rest position;

- figure 2 is a schematic side view of the stabilizing group of figure 1 during a moving step;
- figure 3 is a schematic side view of the stabilizing group according to the present invention during a moving step, where the stabilizing group has a triangular bracket element in raised work position;
- figure 4 is a schematic side view of a first step of the mounting of a tower crane according to the present invention;
- figure 5 is a schematic side view of a second step of the mounting of a tower crane according to the present invention;
- figure 6 is a schematic side view of a third step of the mounting of a tower crane according to the present invention;
- figure 7 is a schematic side view of a tower crane according to the present invention, during normal use;
- figure 8 is a partial section view of a detail of figure 3 indicated with VIII;
- figure 9 is a partial section view of a detail of figure 7 indicated with IX;
- figure 10 is a partial section view of a detail of figure 2 indicated with X.

[0024] With reference to the figures, a tower crane is shown wholly indicated with 20.

[0025] Such a tower crane 20 comprises a vertical tower structure 21, a stabilizing group 10 coupled with such a vertical tower structure 21 and a lifting arm 22 coupled with the stabilizing group 10.

[0026] The vertical tower structure 21 comprises a plurality of modular tower elements adapted for being connected to one another, stacked one on top of the other, so as to form a trestle structure constrained to a base 23 fixed to the ground. The base 23 can consist of a trunk or a plurality of foundation legs or a fixed or translating base.

[0027] In the present description the vertical direction coincides with the direction of extension of the tower structure substantially perpendicular to the plane of the ground where the crane is installed; consequently, the horizontal direction is any direction lying on a plane substantially perpendicular to the vertical direction.

[0028] The stabilizing group 10 comprises a rotary group 30 arranged to be mounted at the top of the vertical tower structure 21 so as to be able to rotate about a vertical axis and to couple with the lifting arm 22.

[0029] In particular, in the illustrated embodiment, the rotary group 30 comprises a base body 31 intended to couple at the bottom with the vertical tower structure 21 and constrained at the top to a fifth wheel 32. The fifth wheel 32, in turn, is fixed at the top to a motorised rotary frame 33. A rotation pinion 34 is engaged in the rotary group 30 passing through the motorised rotary frame 33 and the fifth wheel 32 up to a fixing point on the base body 31.

[0030] The stabilizing group 10 comprises a counter jib 40 that, through a hinge 11 having a horizontal axis, is coupled in a rotary manner to the aforementioned rotary group 30 on the opposite side to that intended for coupling with the lifting arm 22.

[0031] In detail, the hinge 11 defines a horizontal hinging half-plane about which the counter jib 40 can rotate upwards or downwards. Such senses of rotation are defined with reference to the position taken up by the stabilizing group during its normal use, i.e. with respect to the position illustrated in figures 1 or 2 or 3.

[0032] According to the present invention, the stabilizing group 10 comprises limiting means 45, 35 to limit the rotation of the counter jib itself 40 with respect to the rotary group 30 at least in one sense of rotation, i.e. downwards or upwards, with respect to the horizontal hinging half-plane.

[0033] Preferably, the limiting means 45, 35 can be arranged to limit the rotation of the counter jib 40 with respect to the rotary group 30 in both senses of rotation, i.e. both upwards and downwards, with respect to the horizontal hinging half-plane within a predetermined arc. The counter jib 40 is made in the form of an internally hollow beam. The limiting means 45, 35 comprise at least one abutment element 45 positioned internally on the upper and/or lower wall of the counter jib 40 and a plate element 35 jointly constrained to the rotary group 30 that projects inside the counter jib 40 so as to go into abutment against the at least one abutment element 45 during the rotation of the counter jib 40 with respect to the rotary group 30. In particular, if the counter jib 40 rotates downwards with respect to the horizontal hinging half-plane, the plate element 35 abuts against the upper abutment element 45; on the other hand, if the counter jib 40 rotates upwards with respect to the horizontal hinging half-plane, the plate element 35 abuts against the lower abutment element 45.

[0034] In a first alternative embodiment that is not part of the invention, the hinge 11 is positioned in a recess of the rotary group 30 and the limiting means 45, 35 comprise at least one abutment element positioned internally on the upper and/or lower wall of the recess. In this case the counter jib 40 extends in the recess so as to go into abutment against the at least one abutment element during the rotation of the counter jib 40 with respect to the rotary group 30.

[0035] In a second alternative embodiment that is not part of the invention, the limiting means 45, 35 comprise at least one bar element constrained to the rotary group 30 through connection means like, for example, articulated arms. In this case, the at least one bar element extends outside the counter jib 40 above and/or below it, so that the counter jib 40 goes into abutment against the at least one bar element during the rotation of the counter jib 40 with respect to the rotary group 30.

[0036] Preferably, the limiting means 45, 35 are ad-

justable. In this case, the abutment elements 45 can, for example, be made through a bolt screw the head of which acts as an abutment for the plate element 35. Such a screw can be locked so as to project with respect to the inner surface of the beam by a predetermined length according to the width of the arc within which it is wished to limit the rotation of the counter jib 40 with respect to the rotary group 30.

[0037] In a preferred embodiment of the present invention, the stabilizing group 10 comprises a bracket element 12, preferably triangular, pivoted on the rotary group 30 at a first vertex 13, as can be seen in figure 1. A second vertex 14 of such a bracket element 12 is constrained to a first end of at least one tie rod 15 through at least one corresponding articulated arm 16. The at least one tie rod 15 is then constrained in a rotary manner to the counter jib 40 at a second end. In this case, the bracket element 12 is arranged to reversibly pass from a folded rest position, in which the tie rod 15 is at rest, to a raised work position, in which the tie rod 15 exerts an upward traction on the counter jib 40.

[0038] In particular, when the bracket element 12 takes up the raised work position it can be fixed in position by stably fastening a third vertex 17 to the rotary group 30. In particular, when the bracket element 12 is brought into the raised work position, the third vertex 17 is inserted into a receiving seat 38 of the rotary group 30. Such a receiving seat 38 is preferably obtained in the interspace between two parallel plates mounted on the rotary group 30 and, more specifically, on the motorised rotary frame 33 and perforated so that such holes are substantially aligned with a coupling hole made on the bracket element 12 at the third vertex 17. In this way it is possible to quickly and easily pass a pin for coupling with the third vertex 17 of the bracket element 12.

[0039] Preferably, the stabilizing group 10 also comprises a hoisting winch 18 fixed onto the counter jib 40, for example at the opposite end to the hinging with the rotary group 30 as illustrated in figures 1 and 2.

[0040] A rope (not illustrated) for lifting loads is then wound onto such a hoisting winch 18.

[0041] Advantageously, the rotary group 30, according to a preferred embodiment of the present invention, comprises support arms 36 at the portion intended for coupling with the lifting arm 22; a block-carrying trolley 37 is slidably constrained to such support arms 36.

[0042] In particular, the block-carrying trolley 37 is locked in position during the mounting steps and, once the mounting of the crane is complete, is left free to slide first on the support arms 36 and then on the lifting arm 22.

[0043] In this case, the aforementioned lifting rope is brought up to the pulleys of the block already in the assembly shop in pre-assembly step so that, once the mounting of the crane is complete at the building yard, the rope is already in work position.

[0044] As can be seen in figures 4 to 6, the tower crane according to the present invention can be mounted as follows.

[0045] In a first step the vertical tower structure 21 is assembled and fixed to the ground. In particular, the base 23 is fixed to the ground and then the trestle tower structure is mounted.

[0046] In a second step, the stabilizing group 10 is hoisted in its most complete configuration with the bracket element 12 in raised position through a crane truck 50. In this step the stabilizing group 10 is put in a harness and lifted up to the top of the vertical tower structure 21.

[0047] Once the stabilizing group 10 has been coupled with the vertical tower structure 21, the counter-weight ballasts 19 are mounted on the counter jib 40 so as to arrange the stabilizing group 10 to couple with the lifting arm 22.

[0048] Indeed, after the mounting of the ballasts 19 the lifting arm 22 is hoisted, which is then coupled with the rotary group 30 so as to allow the block-carrying trolley to slide on the lifting arm 22 itself.

[0049] From the description that has been made the characteristics of the stabilizing group and of the tower crane object of the present invention are clear, just as the relative advantages are also clear.

[0050] Firstly, indeed, the stabilizing group 10 even in its most complete configuration is easily transportable to the building yard thanks to the presence of the limiting means of the rotation of the counter jib 40.

[0051] In particular, the limitation of the downward rotation allows the stabilizing group 10 to be easily moved also lifting it through ropes fixed on the counter jib 40. Such movement is particularly useful and used during ground transportation, for example for storage in warehouses or containers. The whole of the rotary group 30 and the counter jib 40 can be moved even without the bracket element 12 and the tie rod 15.

[0052] On the other hand, where such a bracket element 12 and the tie rod 15 have been mounted before transportation to the building yard, the bracket element 12 can be arranged in the folded work position giving greater compactness to the stabilizing group.

[0053] The limitation of upward rotation allows the stabilizing group 10 to be lifted in the mounting step, preventing the counter jib 40 and the rotary group 30 from flipping against one another.

[0054] Finally, it is clear that the stabilizing group and the tower crane thus conceived can undergo numerous modifications and variants, within the scope of the claims; moreover, all the details can be replaced by technically equivalent elements. In practice, the materials used, as well as the sizes, can be whatever according to the technical requirements.

Claims

1. Stabilizing group (10) for a tower crane (20), of the type comprising a vertical tower structure (21) and a lifting arm (22), said stabilizing group (10) comprising:

- a rotary group (30) arranged to be mounted at the top of said vertical tower structure (21) so as to be able to rotate about a vertical axis, said rotary group (30) also being arranged to couple with said lifting arm (22) ;
- a counter jib (40) rotatably coupled through a hinge (11) having horizontal axis with said rotary group (30) on the opposite side to that intended for coupling with said lifting arm (22), said hinge (11) defining a horizontal hinging half-plane;
- limiting means (35, 45) for limiting the rotation of said counter jib (40) with respect to said rotary group (30) at least in one sense of rotation with respect to the horizontal hinging half-plane **characterised in that** said counter jib (40) is made in the form of an internally hollow beam and said limiting means (35, 45) comprise:

  - at least one abutment element (45) positioned internally on the upper and/or lower wall of said counter jib (40);
  - a plate element (35) constrained to said rotary group (30), said plate element (35) projecting inside said counter jib (40) so as to go into abutment against said at least one abutment element (45) during the rotation of said counter jib (40) with respect to said rotary group (30).

2. Stabilizing group (10) for a tower crane (20) according to claim 1, wherein said limiting means (35, 45) are arranged to limit said rotation of said counter jib (40) with respect to said rotary group (30) in both senses of rotation with respect to the horizontal hinging half-plane within a predetermined arc.

3. Stabilizing group (10) for a tower crane (20) according to claim 1 or 2, wherein said limiting means (35, 45) are adjustable.

4. Stabilizing group (10) for a tower crane (20) according to one of the previous claims, wherein said stabilizing group (10) comprises a bracket element (12) pivoted on said rotary group (30) at a first vertex (13), a second vertex (14) of said bracket element (12) being constrained to a first end of at least one tie rod (15) through at least one corresponding articulated arm (16), said at least one tie rod (15) being constrained in a rotary manner to said counter jib (40) at a second end, said bracket element (12) being arranged to reversibly pass from a folded rest position, in which said tie rod (15) is at rest, and a raised work position in which said tie rod (15) exerts traction upwards on said counter jib (40), in said raised position a third vertex (17) of said bracket element (12) being stably fastened to said rotary group (30).

5. Stabilizing group (10) for a tower crane (20) according to claim 4, wherein, when said bracket element (12) is taken into said raised work position, said third vertex (17) is inserted in a receiving seat (38) of said rotary group (30), said receiving seat (38) being obtained in the interspace between two parallel plates mounted on said rotary group (30) and perforated so that such holes are substantially aligned with a coupling hole made on said bracket element (12) at said third vertex (17).

6. Stabilizing group (10) for a tower crane (20) according to one of the previous claims comprising a hoisting winch (18) fixed on said counter jib (40).

7. Stabilizing group (10) for a tower crane (20) according to one of the previous claims, wherein said rotary group (30) at the portion intended for coupling with said lifting arm (22) comprises support arms (36) to which a block-carrying trolley (37) is slidably constrained.

8. Tower crane (20) comprising:

- a vertical tower structure (21) constrained to a base (23) ;
- a stabilizing group (10) according to one of the previous claims coupled with said vertical tower structure (21);
- a lifting arm (22) coupled with said stabilizing group (10).

Patentansprüche

1. Stabilisierungsgruppe (10) für einen Turmkran (20) des Typs, der eine vertikale Turmstruktur (21) und einen Hubarm (22) umfasst, wobei die Stabilisierungsgruppe (10) Folgendes umfasst:

- eine Drehgruppe (30), die angeordnet ist, um an der Spitze der vertikalen Turmstruktur (21) eingebaut zu werden, um in der Lage zu sein, sich um eine vertikale Achse zu drehen, wobei die Drehgruppe (30) außerdem angeordnet ist, um an den Hubarm (22) anzukoppeln;
- ein Spitzenausleger-Gegenstück (40), das drehbar durch ein horizontalachsiges Gelenk (11) an die Drehgruppe (30) auf der Seite angekoppelt ist, die der zum Ankoppeln an den Hubarm (22) vorgesehenen Seite gegenüberliegt, wobei das Gelenk (11) eine horizontale Gelenk-Halbebene definiert;
- Begrenzungsmittel (35, 45), um die Drehung des Spitzenausleger-Gegenstücks (40) in Bezug auf die Drehgruppe (30) wenigstens in eine Drehrichtung in Bezug auf die horizontale Gelenk-Halbebene zu begrenzen, **dadurch gekennzeichnet, dass**

das Spitzenausleger-Gegenstück (40) in Form eines inwendig hohlen Balkens hergestellt ist und die Begrenzungsmittel (35, 45) Folgendes umfassen:

- wenigstens ein Widerlagerelement (45), das intern auf der oberen und/oder unteren Wand des Spitzenausleger-Gegenstücks (40) positioniert ist;
- ein Plattenelement (35), das an der Drehgruppe (30) festgelegt ist, wobei das Plattenelement (35) ins Innere des Spitzenausleger-Gegenstücks (40) auskragt, derart, dass es während der Drehung des Spitzenausleger-Gegenstücks (40) in Bezug auf die Drehgruppe (30) gegen das wenigstens eine Widerlagerelement (45) in Anschlag geht.

2. Stabilisierungsgruppe (10) für einen Turmkran (20) nach Anspruch 1, wobei die Hubmittel (35, 45) angeordnet sind, um die Drehung des Spitzenausleger-Gegenstücks (40) in Bezug auf die Drehgruppe (30) in beide Drehrichtungen in Bezug auf die horizontale Gelenk-Halbebene innerhalb eines vorgegebenen Bogens zu begrenzen.

3. Stabilisierungsgruppe (10) für einen Turmkran (20) nach Anspruch 1 oder 2, wobei die Begrenzungsmittel (35, 45) einstellbar sind.

4. Stabilisierungsgruppe (10) für einen Turmkran (20) nach einem der vorstehenden Ansprüche, wobei die Stabilisierungsgruppe (10) ein Auslegerelement (12) umfasst, das an der Drehgruppe (30) an einem ersten Scheitelpunkt (13) drehbar gelagert ist, wobei ein zweiter Scheitelpunkt (14) des Auslegerelements (12) an einem ersten Ende von wenigstens einer Zugstange (15) durch wenigstens einen entsprechenden gelenkigen Arm (16) festgelegt ist, wobei die wenigstens eine Zugstange (15) auf drehbare Weise an dem Spitzenausleger-Gegenstück (40) an einem zweiten Ende festgelegt ist, wobei das Auslegerelement (12) angeordnet ist, um reversibel von einer zusammengeklappten Ruhestellung, in der die Zugstange (15) sich in Ruhelage befindet, zu einer angehobenen Arbeitsstellung überzugehen, in der die Zugstange (15) eine Zugkraft nach oben auf das Spitzenausleger-Gegenstück (40) ausübt, wobei in der angehobenen Stellung ein dritter Scheitelpunkt (17) des Auslegerelements (12) stabil an der Drehgruppe (30) befestigt ist.

5. Stabilisierungsgruppe (10) für einen Turmkran (20) nach Anspruch 4, wobei dann, wenn das Auslegerelement (12) in die angehobene Arbeitsstellung gebracht wird, der dritte Scheitelpunkt (17) in einen Aufnahmesitz (38) der Drehgruppe (30) eingefügt wird, wobei der Aufnahmesitz (38) in dem Zwischenraum zwischen zwei parallelen Platten erhalten ist, die auf der Drehgruppe (30) eingebaut und gelocht sind, so dass derartige Bohrungen im Wesentlichen auf ein Koppelloch ausgerichtet sind, das in dem Auslegerelement (12) an dem dritten Scheitelpunkt (17) ausgebildet ist.

6. Stabilisierungsgruppe (10) für einen Turmkran (20) nach einem der vorstehenden Ansprüche, umfassend eine Hubwinde (18), die an dem Spitzenausleger-Gegenstück (40) befestigt ist.

7. Stabilisierungsgruppe (10) für einen Turmkran (20) nach einem der vorstehenden Ansprüche, wobei die Drehgruppe (30) an dem zum Ankoppeln an den Hubarm (22) vorgesehenen Abschnitt Stützarme (36) umfasst, an denen eine bocktragende Laufkatze (37) verschiebbar festgelegt ist.

8. Turmkran (20) umfassend:

- eine vertikale Turmstruktur (21), die an einer Basis (23) festgelegt ist;
- eine Stabilisierungsgruppe (10) nach einem der vorstehenden Ansprüche, die an die vertikale Turmstruktur (21) angekoppelt ist;
- einen Hubarm (22), der an die Stabilisierungsgruppe (10) angekoppelt ist.

Revendications

1. Groupe de stabilisation (10) pour une grue à tour (20), du type comprenant une structure de tour verticale (21) et un bras de levage (22), ledit groupe de stabilisation (10) comprenant :

- un groupe de rotation (30) agencé pour être monté au sommet de ladite structure de tour verticale (21) de manière à pouvoir tourner autour d'un axe vertical, ledit groupe de rotation (30) étant également agencé pour s'accoupler avec ledit bras de levage (22) ;
- une contre-flèche (40) couplée de manière rotative par l'intermédiaire d'une articulation (11) ayant un axe horizontal avec ledit groupe de rotation (30) du côté opposé à celui destiné à l'accouplement avec ledit bras de levage (22), ladite articulation (11) définissant un demi-plan d'articulation horizontal ;
- des moyens de limitation (35, 45) pour limiter la rotation de ladite contre-flèche (40) par rapport audit groupe de rotation (30) dans au moins un sens de rotation par rapport au demi-plan d'articulation horizontal

caractérisé en ce que
ladite contre-flèche (40) est réalisée sous la forme d'une poutre intérieurement creuse et lesdits

moyens de limitation (35, 45) comprennent :

- au moins un élément de butée (45) positionné intérieurement sur la paroi supérieure et/ou inférieure de ladite contre-flèche (40);
- un élément de plaque (35) fixé audit groupe de rotation (30), ledit élément de plaque (35) faisant saillie à l'intérieur de ladite contre-flèche (40) de manière à venir en butée contre ledit au moins un élément de butée (45) durant la rotation de ladite contre-flèche (40) par rapport audit groupe de rotation (30).

2. Groupe de stabilisation (10) pour une grue à tour (20) selon la revendication 1, dans lequel lesdits moyens de limitation (35, 45) sont agencés pour limiter ladite rotation de ladite contre-flèche (40) par rapport audit groupe de rotation (30) dans les deux sens de rotation par rapport au demi-plan d'articulation horizontal dans un arc prédéterminé.

3. Groupe de stabilisation (10) pour une grue à tour (20) selon la revendication 1 ou 2, dans lequel lesdits moyens de limitation (35, 45) sont réglables.

4. Groupe de stabilisation (10) pour une grue à tour (20) selon une des revendications précédentes, dans lequel ledit groupe de stabilisation (10) comprend un élément de support (12) pivoté sur ledit groupe de rotation (30) au niveau d'un premier sommet (13), un deuxième sommet (14) dudit élément de support (12) étant fixé à une première extrémité d'au moins un tirant (15) par l'intermédiaire d'au moins un bras articulé correspondant (16), ledit au moins un tirant (15) étant fixé de manière rotative à ladite contre-flèche (40) au niveau d'une deuxième extrémité, ledit élément de support (12) étant agencé pour passer de manière réversible d'une position de repos repliée, dans laquelle ledit tirant (15) est au repos, et une position de travail relevée dans laquelle ledit tirant (15) exerce une traction vers le haut sur ladite contre-flèche (40), dans ladite position relevée, un troisième sommet (17) dudit élément de support (12) étant fixé de manière stable audit groupe de rotation (30).

5. Groupe de stabilisation (10) pour une grue à tour (20) selon la revendication 4, dans lequel, quand ledit élément de support (12) se trouve dans ladite position de travail relevée, ledit troisième sommet (17) est inséré dans un siège de réception (38) dudit groupe de rotation (30), ledit siège de réception (38) étant obtenu dans l'espace intermédiaire entre deux plaques parallèles montées sur ledit groupe de rotation (30) et perforé de manière que ces trous soient sensiblement alignés avec un trou d'accouplement réalisé sur ledit élément de support (12) au niveau dudit troisième sommet (17).

6. Groupe de stabilisation (10) pour une grue à tour (20) selon une des revendications précédentes, comprenant un treuil de levage (18) fixé sur ladite contre-flèche (40).

7. Groupe de stabilisation (10) pour une grue à tour (20) selon une des revendications précédentes, dans lequel ledit groupe de rotation (30), au niveau de la portion destinée à l'accouplement avec ledit bras de levage (22), comprend des bras de support (36) auxquels un chariot de support de bloc (37) est fixé de manière coulissante.

8. Grue à tour (20) comprenant :

- une structure de tour verticale (21) fixée à une base (23) ;
- un groupe de stabilisation (10) selon une des revendications précédentes, accouplé à ladite structure de tour verticale (21) ;
- un bras de levage (22) accouplé audit groupe de stabilisation (10).

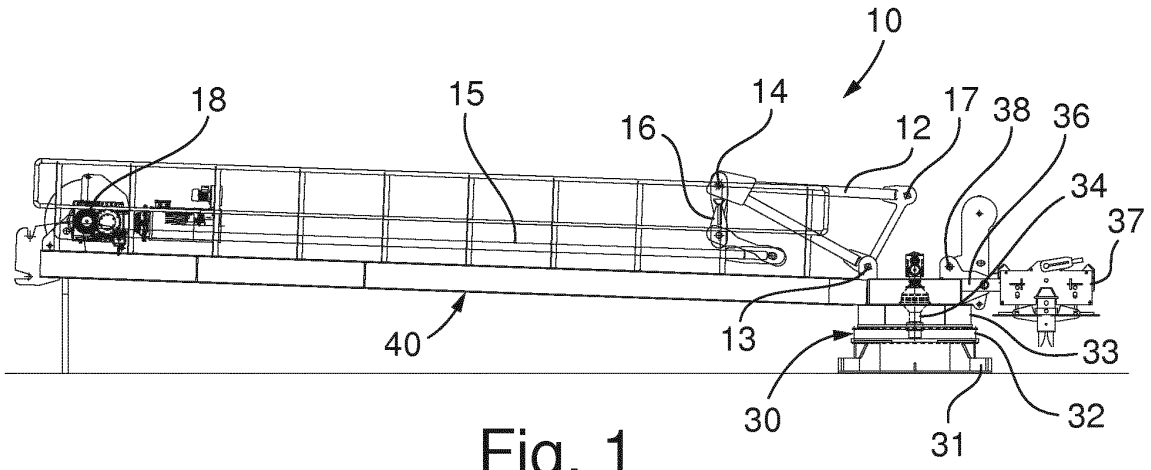


Fig. 1

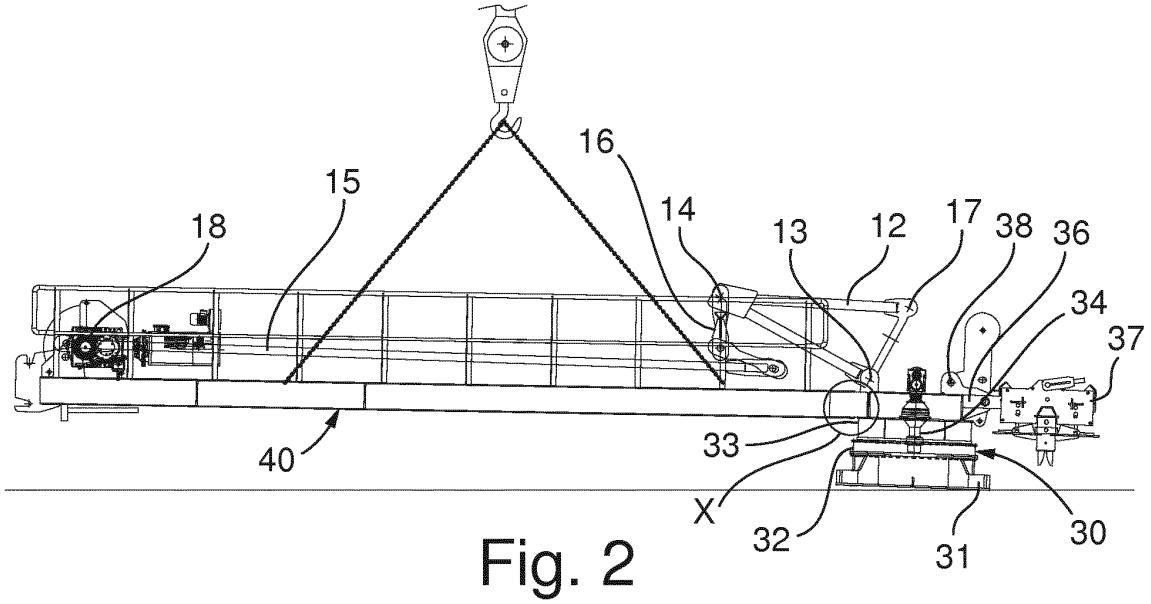


Fig. 2

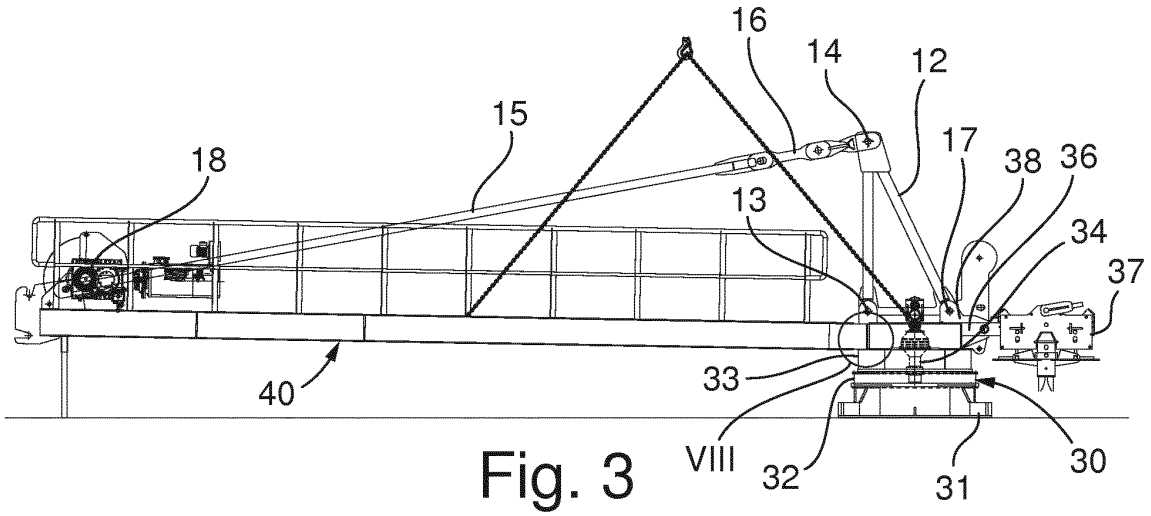
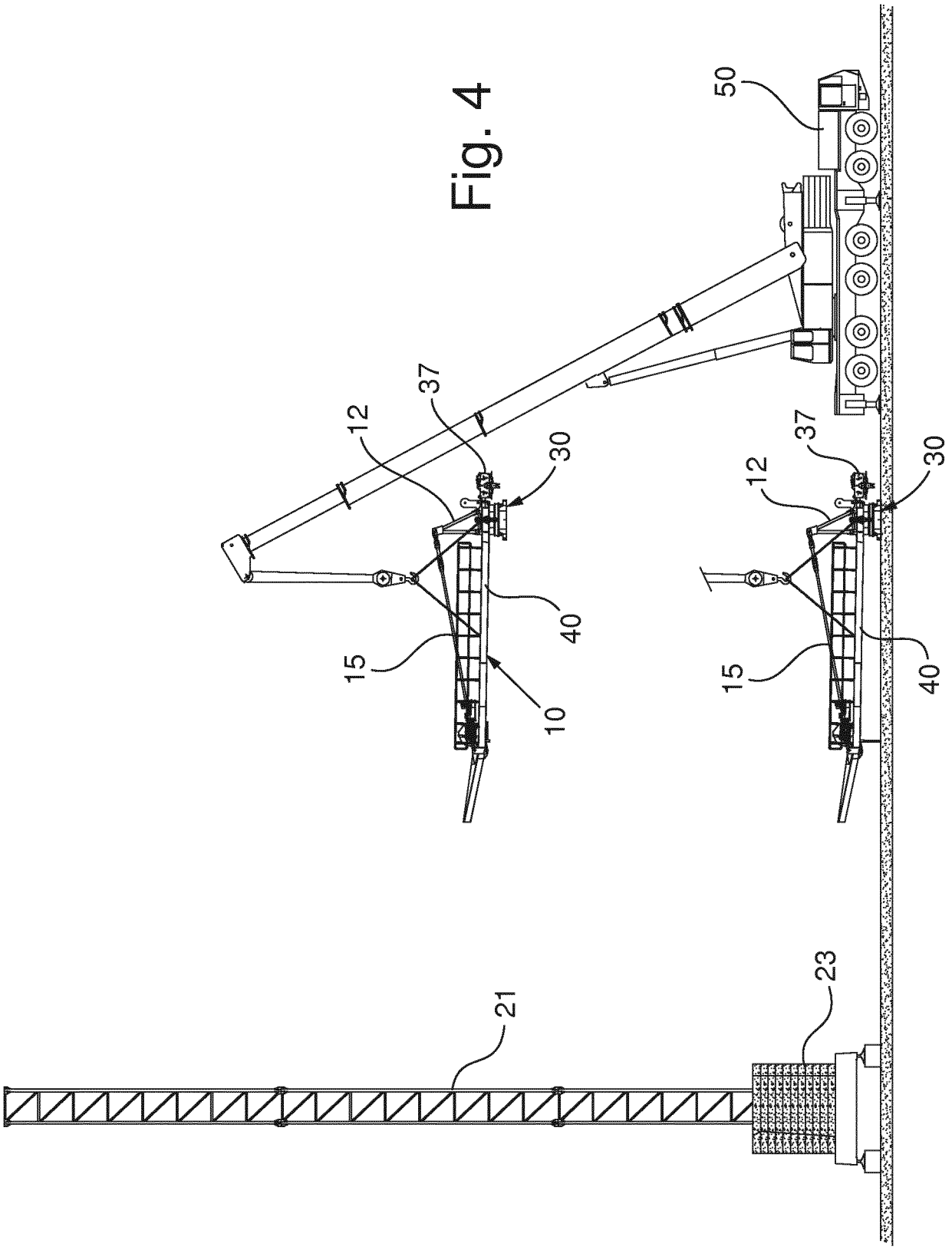


Fig. 3

Fig. 4



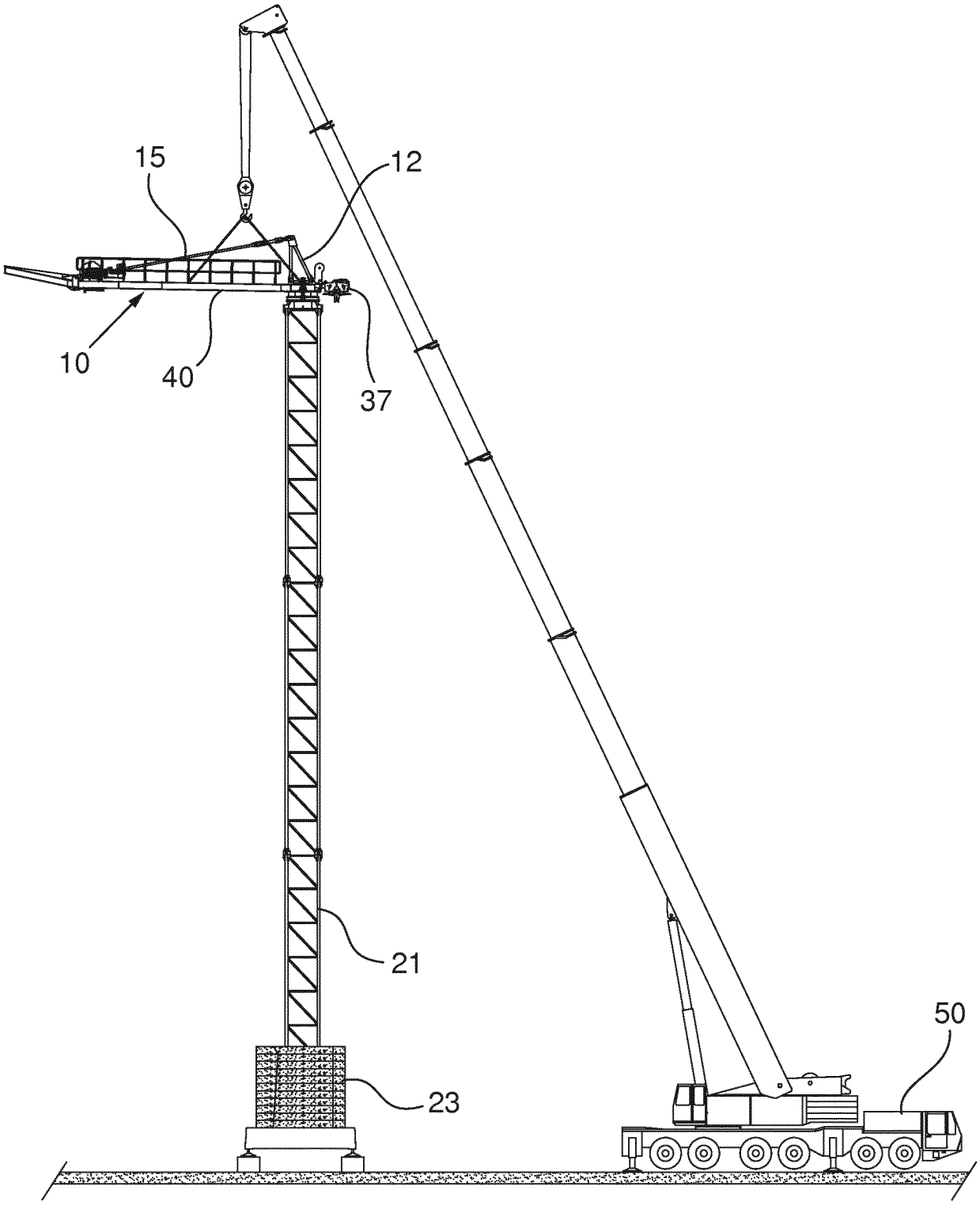


Fig. 5

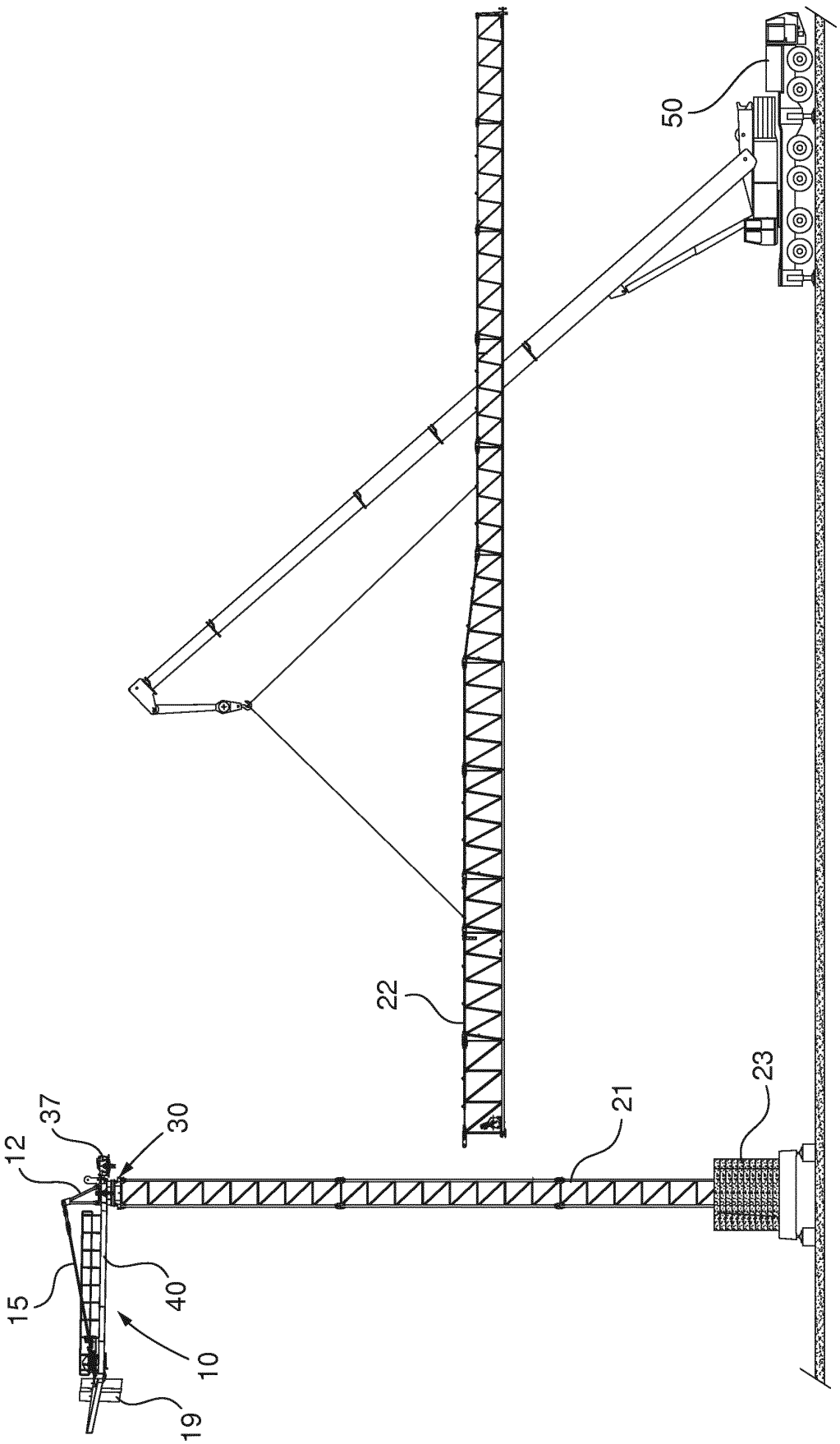


Fig. 6

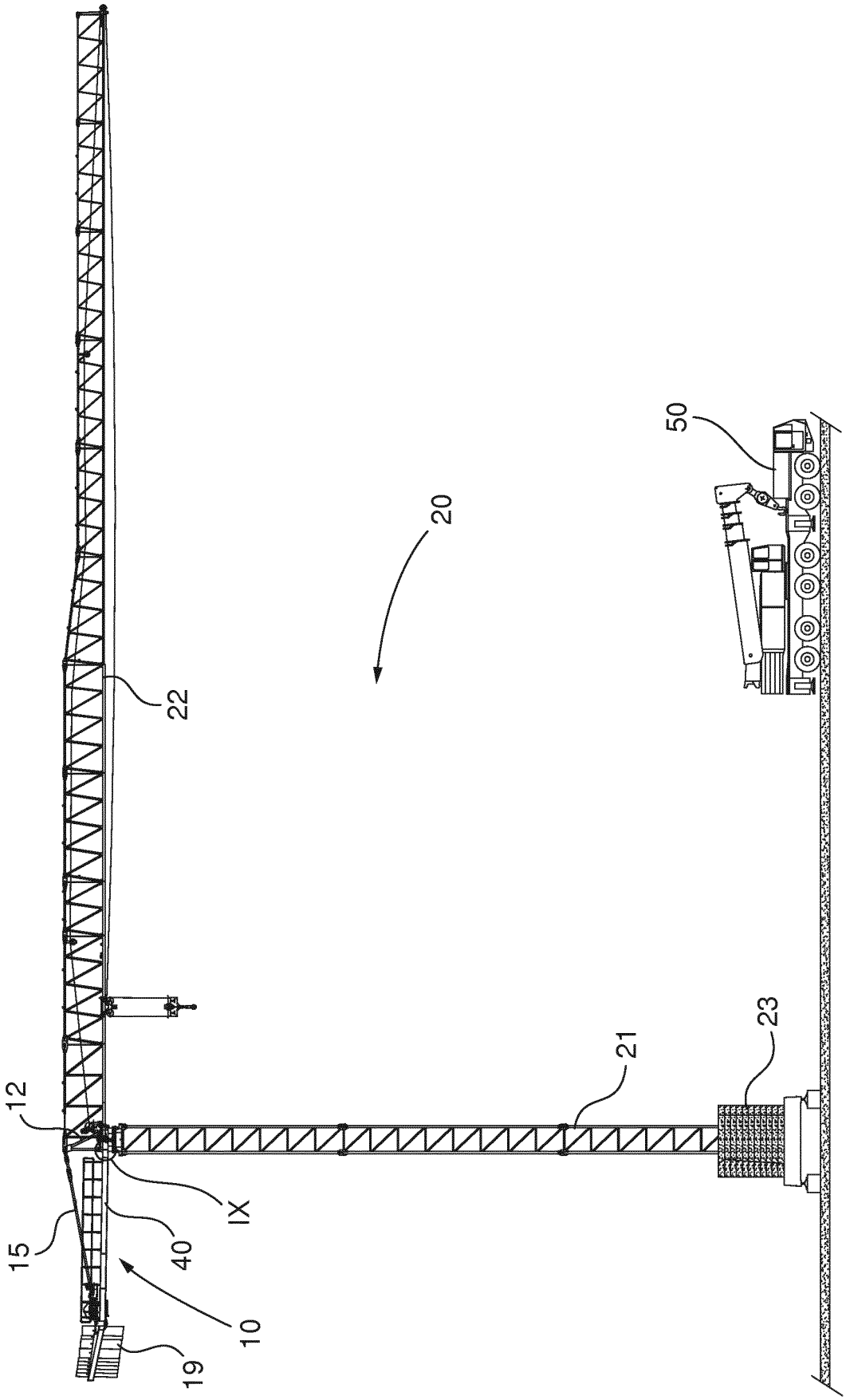


Fig. 7

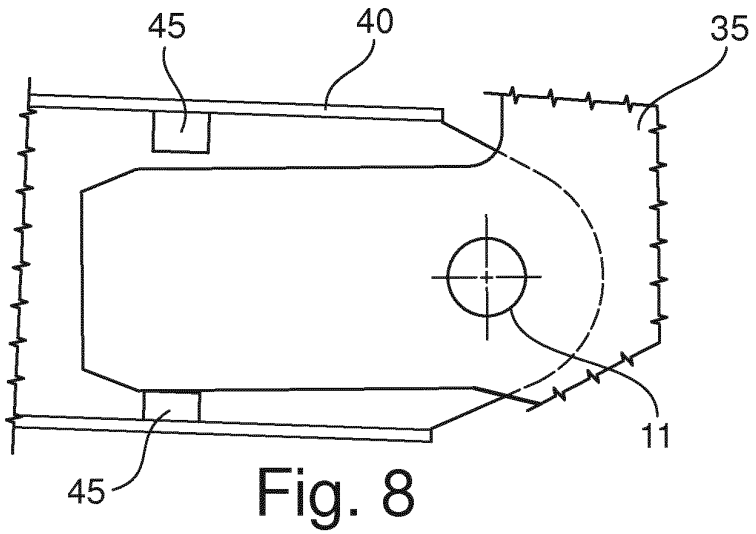


Fig. 8

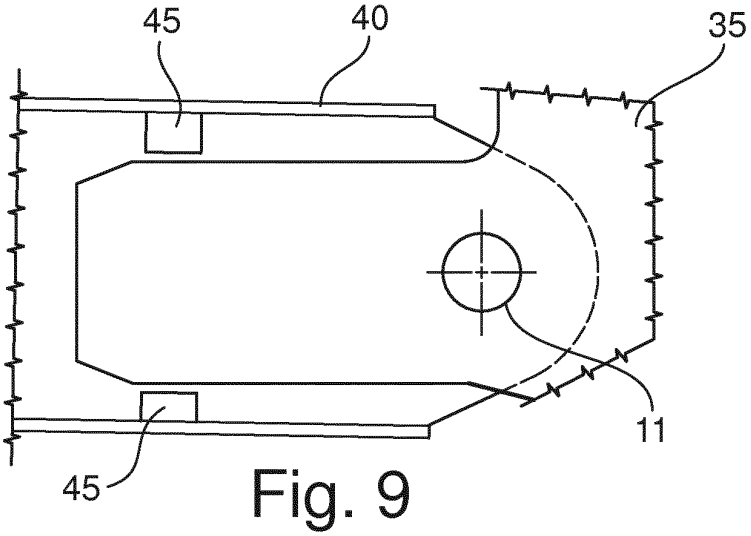


Fig. 9

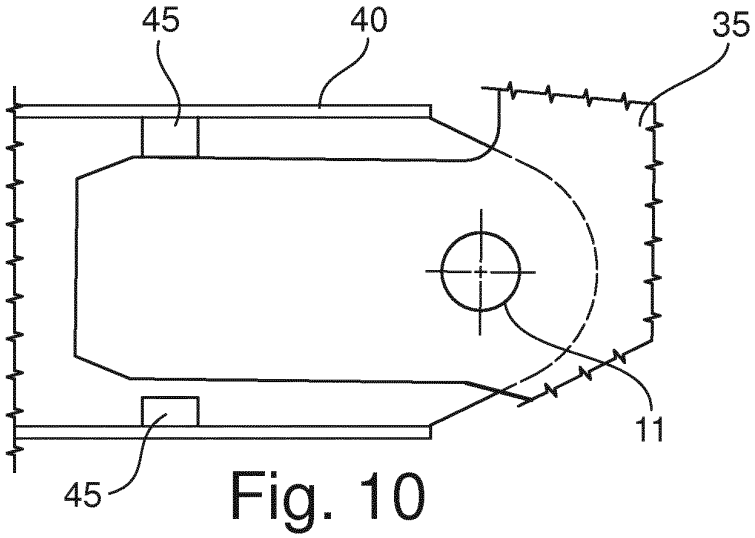


Fig. 10

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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