(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 738 134 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
04.06.2014 Bulletin 2014/23

(21) Application number: **12818019.7**

(22) Date of filing: **12.07.2012**

(51) Int Cl.:
B66C 23/64 *(2006.01)* ***B66C 23/66*** *(2006.01)*
B66C 23/70 *(2006.01)* ***B66C 23/26*** *(2006.01)*

(86) International application number:
PCT/ES2012/000191

(87) International publication number:
WO 2013/014302 (31.01.2013 Gazette 2013/05)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **28.07.2011 ES 201100860**

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(54) JIB/COUNTER-JIB STRUCTURE FOR A FREE-STANDING TOWER CRANE

(57) The present invention relates to a jib/counter-jib structure for a flat top tower crane, formed by partial sections, each of which comprises a fixed lower lattice structure (9) provided with end couplings (11) for connecting with other consecutive sections, and an upper lattice structure (10) formed by side panels (12), which are connected to the lower lattice structure (9) by means of articulated or removable couplings (13), such that said panels (12) of the upper lattice structure (10) can be removed or lowered with respect to the lower lattice structure (9) for transporting the section.

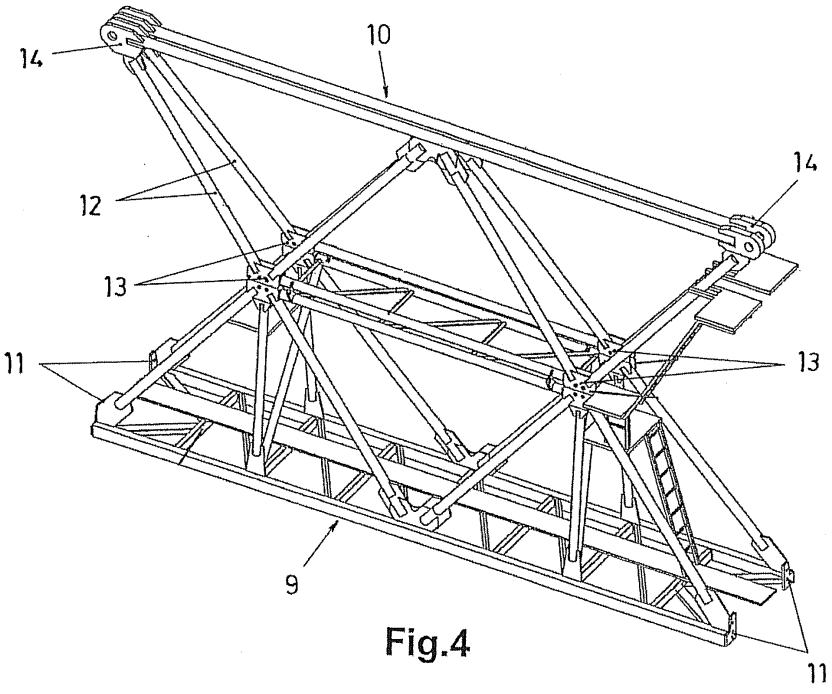

Fig.4

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Description

Sector of the Art

[0001] The present invention relates to tower cranes that are fundamentally used in construction work sites, proposing a jib or counter-jib structure for flat top cranes with an embodiment that provides technical and economic advantages with respect to the solutions used today in forming said structures.

State of the Art

[0002] A tower crane is a discontinuously operating piece of hoist equipment intended for hoisting and distributing in space loads suspended from a hook or from any other holding means. These cranes are most commonly used in construction work sites, their installation being temporary, so they are usually subjected to regular assemblies, dismantlings and transfers.

[0003] Such cranes are formed by a series of fundamental structural parts which are: base, tower, slewing platform, jib, counter-jib, counterweight, head section, ballast, jib trolley and load holding element.

[0004] The base is the element bearing the crane tower and the ballast which is necessary for assuring stability.

[0005] The tower is a vertical structure comprised between the base and the upper portion of the crane.

[0006] The slewing platform is a structure that can be oriented as a result of a slewing bearing located in the upper part of the tower.

[0007] The jib is a structural component capable of bearing the hoist loads in the corresponding ranges.

[0008] The counter-jib is a structural component bearing the counterweight of the crane.

[0009] The counterweight is a mass which is secured in the counter-jib and the function of which is to counteract and balance part of the actions of the payload and some parts of the crane during operation.

[0010] The tower head section is a structural element integrating the slewing part and is capable of bearing and transmitting forces from the jib and counter-jib structures.

[0011] The ballast is a mass which is secured at the base for the purpose of stabilizing the structural assembly of the crane.

[0012] The jib trolley is a device carrying the load holding member, said trolley being moveable along the jib.

[0013] The holding member is a device the purpose of which is load suspension, being able to be in the form of a hook, a bucket, an electromagnet, etc., depending on the type of loads to be handled with the crane.

[0014] Two main versions of tower cranes, i.e., braced and flat top cranes , are known today; braced tower cranes using a large tower head section to which tensioning braces which aid in bearing part of the crane's weight and part of the load transmitted by the jib and counter-jib structures are secured; whereas flat top tower cranes use a tower head section that is smaller than the equivalent tower head section of braced tower cranes.

[0015] Large tower cranes (with a capacity greater than 750 Tm) were conventionally designed with the braced solution because the jib structure of such cranes requires dimensions that are smaller than the equivalent thereof in a flat top tower crane, this smaller size allowing transport in conventional containers, which is impossible with flat top tower cranes, due to the size of the jib structure such cranes require for large capacities.

Object of the Invention

[0016] According to the invention, a jib and/or counter-jib structure of a flat top tower crane is proposed, whereby features providing advantages for forming cranes of this type which have a great capacity and are easy to transport are achieved.

[0017] This structure object of the invention is formed by partial sections which allow forming a jib or a counter-jib by means of successively connecting identical sections, each section comprising a lower lattice structure forming end couplings intended for connecting with other consecutive sections, and an upper lattice structure formed by panels that are arranged in an articulated or removable manner on the lower lattice structure, these panels incorporating on the edge opposite the edge connected with the lower lattice structure couplings for connecting with one another and in turn for connecting with other consecutive sections; the lower lattice structure forming a truncated pyramid formation, whereas the upper lattice structure forms a formation having a triangular profile on the upper base of the lower lattice structure.

[0018] A structure in the sections of which the panels of the upper lattice structure can be dismantled or collapsed on the sides of the lower lattice structure is thus obtained, whereby said sections forming the structure can be transported in small-sized containers to form the sections of the structure with a large cross-section, and therefore being very strong, once they are at the destination by means of deploying or assembling the panels of the upper structure.

[0019] The proposed structure therefore has very advantageous features for forming jibs and counter-jibs of high capacity flat top tower cranes, acquiring its own identity and preferred character for said application.

Description of the Drawings

[0020]

Figure 1 shows a general diagram of the structural parts of a conventional braced tower crane.

Figure 2 is a general diagram of the structural parts of a conventional flat top tower crane.

Figure 3 is a perspective view of a detail of a structural section according to the object of the invention in a collapsed position.

Figure 4 is a perspective view of a detail of the struc-

tural section of the preceding figure in a deployed position.

Detailed Description of the Invention

[0021] The object of the invention relates to a structure intended for forming a jib or a counter-jib for a flat top tower crane, for example of the type structured by a jib (1), a counter-jib (2), a tower head section (3), a counterweight (4), a slewing part (5), a tower (6) and a base (7), such as that depicted in Figure 2.

[0022] The purpose of said structure object of the invention is to allow the construction of tower cranes of this type with a capacity similar to that of large tower cranes provided with a brace (8), such as that depicted in Figure 1, the jib (1) and the counter-jib (2) having a structural strength that allows eliminating the braces (8) and, therefore reducing the tower head section (3), and at the same time with an embodiment that allows collapsing or dismantling for transport in conventional containers.

[0023] The proposed structure is formed by partial sections that allow forming a jib (1) or a counter-jib (2) by means of successively connecting identical sections.

[0024] Each partial section of said structure object of the invention (Figures 3 and 4) comprises a lower lattice structure (9) formed according to a truncated pyramid formation, and an upper lattice structure (10) that is arranged forming a formation having a triangular profile on said lower structure (9).

[0025] The lower lattice structure (9) is formed by a fixed structural assembly having end couplings (11) for connecting with other consecutive sections; whereas the upper lattice structure (10) is formed by side panels (12) which are connected by an edge to the upper part of the lower lattice structure (9) by means of couplings (13) that can be articulated or removable, whereas on the other edge said panels (12) have other couplings (14) for connecting with one another and with other consecutive sections.

[0026] With this formation, the sections forming the proposed structure have a large cross-section and are therefore very strong, allowing the formation of jibs (1) and counter-jibs (2) to be suitable for flat top tower cranes having a large load capacity.

[0027] However, the panels (12) of the upper lattice structure (10) can de dismantled from the lower lattice structure (9) or lowered onto the sides thereof in a simple and quick manner, which allows transporting the sections forming the structure in small-sized conventional containers, thus facilitating the transport of the cranes between their different use locations.

Claims

1. A jib/counter-jib structure for a flat top tower crane, formed by partial sections that can be connected consecutively to form a jib or a counter-jib, **characterized in that** each partial section comprises a fixed lower lattice structure (9) having end couplings (11) for connecting with other consecutive sections, and an upper lattice structure (10) formed by side panels (12) that are connected to the lower lattice structure (9) by means of articulated or removable couplings (13), said panels (12) incorporating on the edge opposite the edge connected with the lower lattice structure (9) couplings (14) for connecting with one another and with other consecutive sections.

2. The jib/counter-jib structure for a flat top tower crane according to claim 1, **characterized in that** the lower lattice structure (9) forms a truncated pyramid formation on which the upper lattice structure (10) is incorporated.

3. The jib/counter-jib structure for a flat top tower crane according to claim 1, **characterized in that** the upper lattice structure (10) forms a formation having a triangular profile on the lower lattice structure (9).

4. The jib/counter-jib structure for a flat top tower crane according to claim 1, **characterized in that** the panels (12) of the upper lattice structure (10) can be removed with respect to the lower lattice structure (9).

5. The jib/counter-jib structure for a flat top tower crane according to claim 1, **characterized in that** the panels (12) of the upper lattice structure (10) can be lowered onto the sides of the lower lattice structure (9).

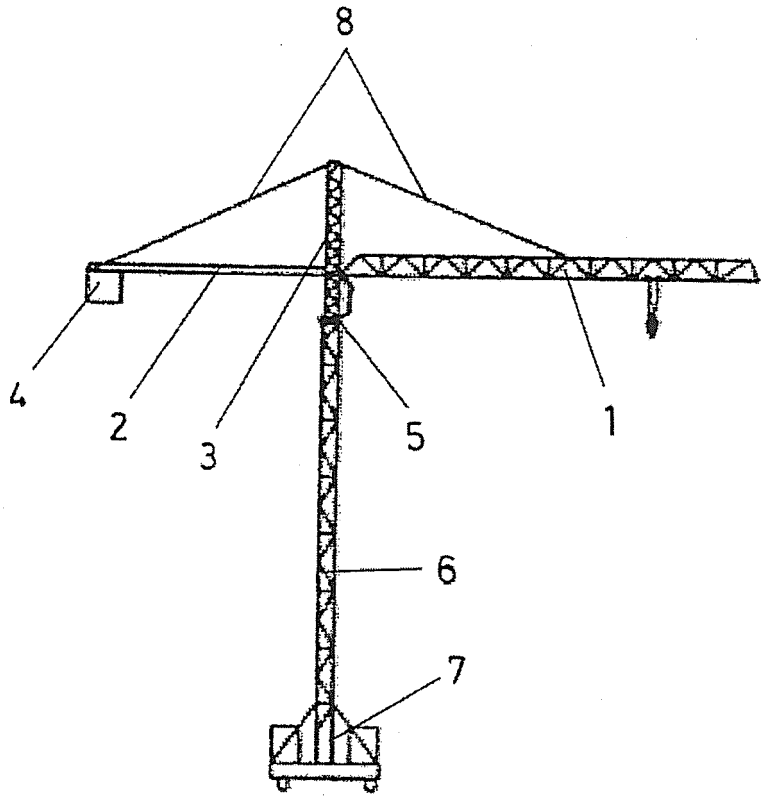

Fig.1

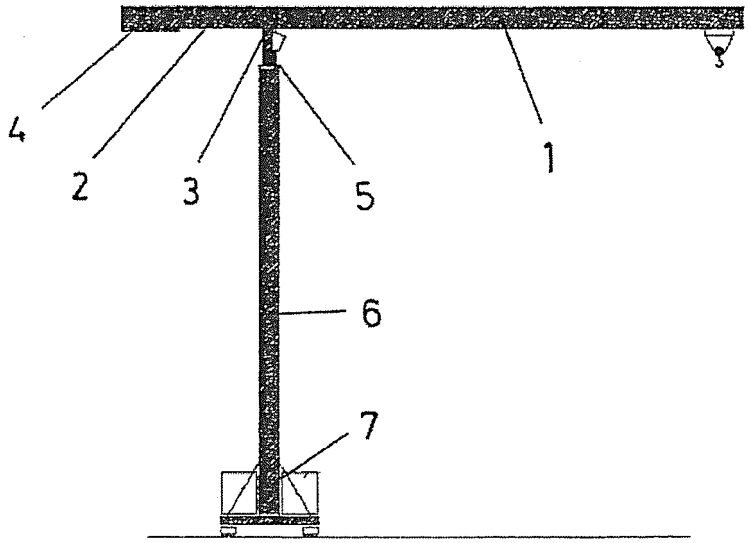

Fig.2

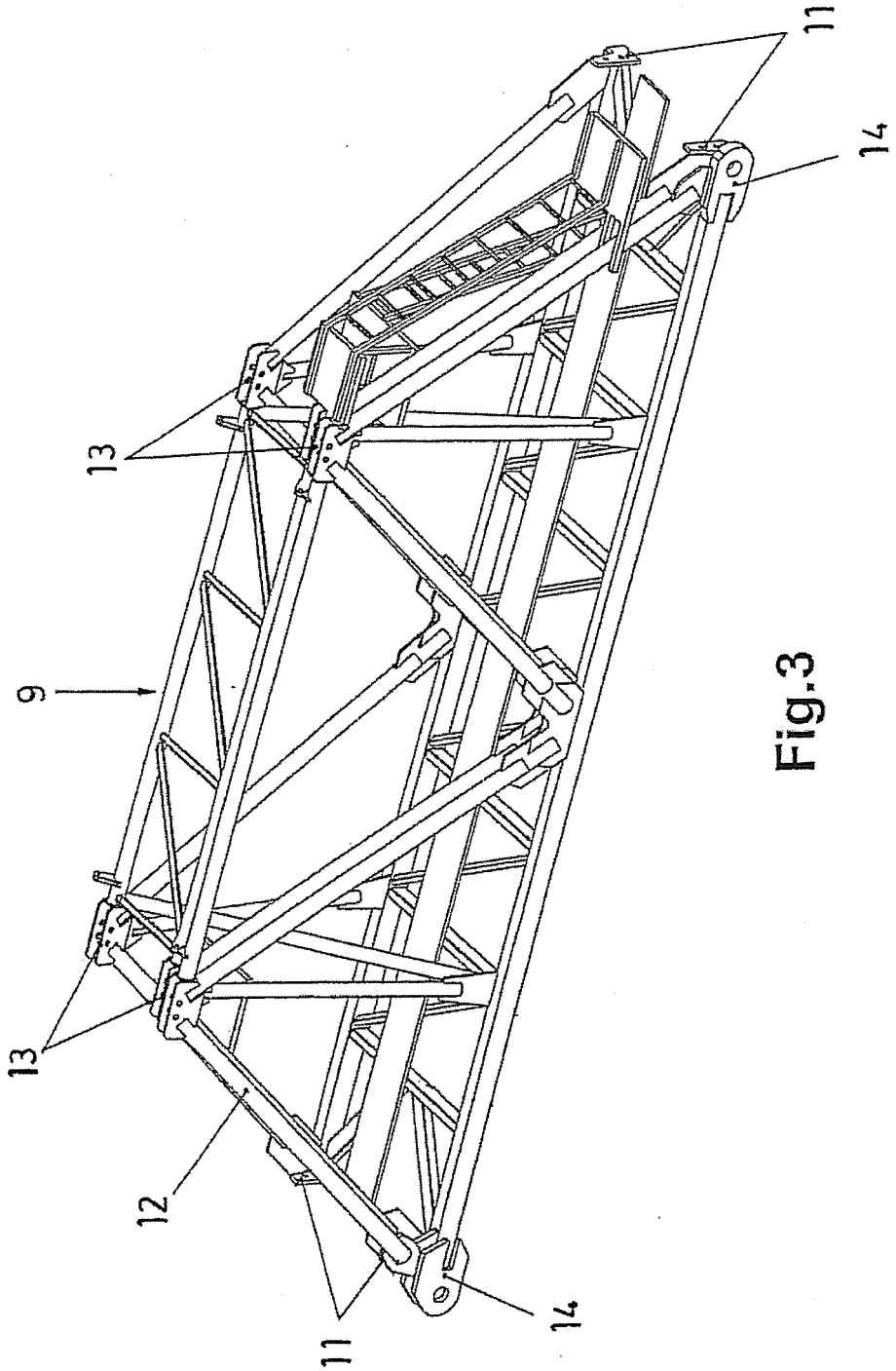

Fig.3

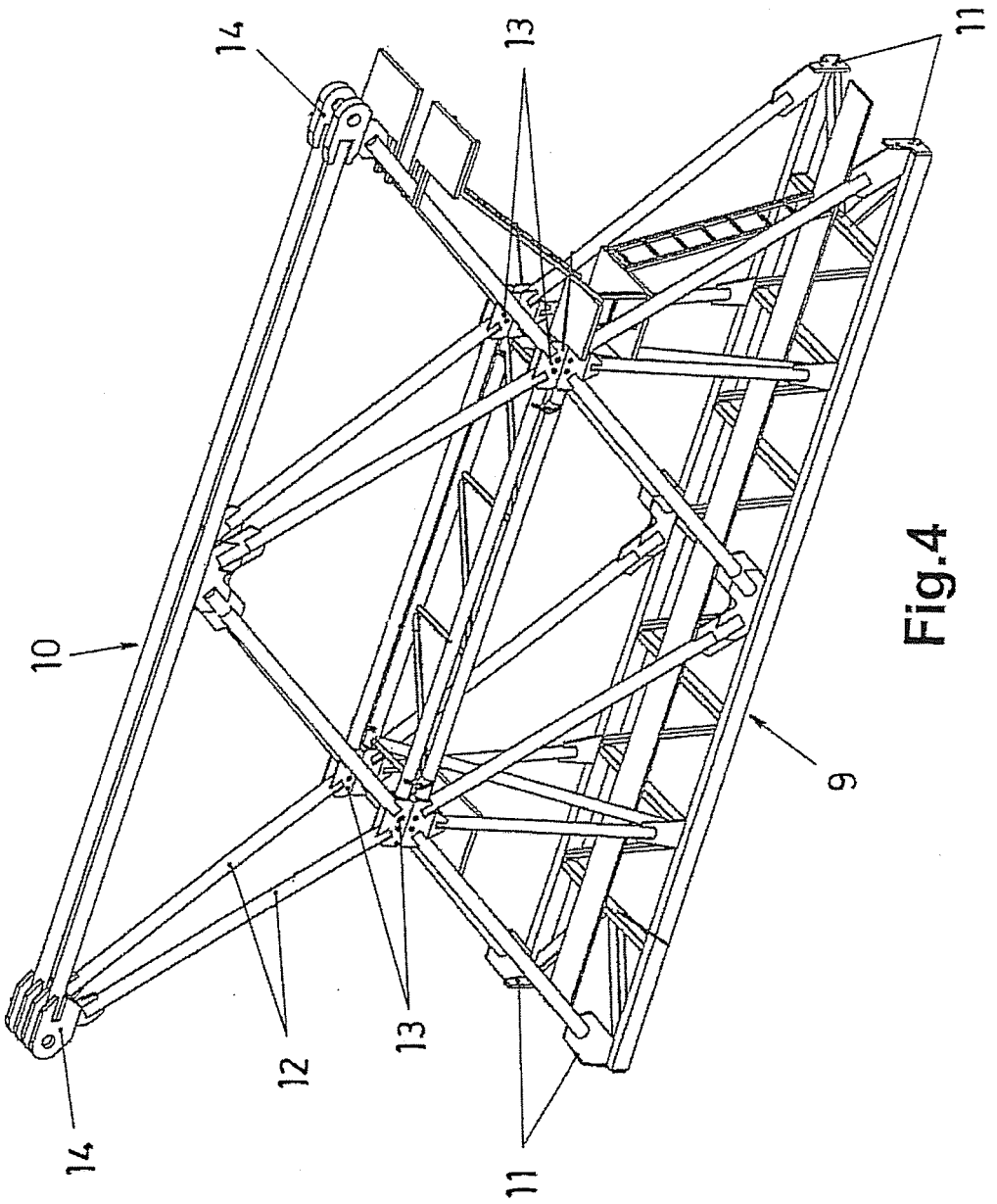

Fig.4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2012/000191

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B66C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, INVENES

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 2004238471 A1 (LISSANDRE MICHEL) 02/12/2004. Abstract from DataBase EPODOC. Retrieved from EPOQUE. Figures.	1

☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
26/11/2012	**(28/11/2012)**
Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04	Authorized officer L. Molina Baena Telephone No. 91 3495554

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2012/000191

C (continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of documents, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
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Form PCT/ISA/210 (patent family annex) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2012/000191

CLASSIFICATION OF SUBJECT MATTER

B66C23/64 (2006.01)
B66C23/66 (2006.01)
B66C23/70 (2006.01)
B66C23/26 (2006.01)

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