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

(11) **EP 4 129 886 A1**

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

(43) Date of publication:
08.02.2023 Bulletin 2023/06

(21) Application number: **21721598.7**

(22) Date of filing: **22.03.2021**

(51) International Patent Classification (IPC):
B66C 23/20 *(1968.09)* ***B66C 23/02*** *(1968.09)*

(52) Cooperative Patent Classification (CPC):
B66C 23/201; B66C 23/027; B66C 2700/0385

(86) International application number:
PCT/IB2021/052365

(87) International publication number:
WO 2021/198842 (07.10.2021 Gazette 2021/40)

(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
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **31.03.2020 PT 2020116212**

(71) Applicant: **Vieira, Armindo Augusto**
2740-105 Porto Salvo (PT)

(72) Inventor: **Vieira, Armindo Augusto**
2740-105 Porto Salvo (PT)

(74) Representative: **Patentree**
Edificio Net
Rua de Salazares, 842
4149-002 Porto (PT)

(54) **METAL GANTRY FOR A LIFTING DEVICE FOR TRANSPORTING MATERIALS, APPLICATION PROCESS AND USES THEREOF**

(57) Metal gantry for supporting a lifting device for transporting materials, comprising: a telescopic structure comprising an outer tube and an inner tube; an arm rotatably connected to the outer tube, for the displacement of the lifting device transverse to the telescopic structure; a nut for threading at the upper end of the outer tube; a shaft to hold the inner tube within the outer tube in said nut; wherein the outer tube comprises a base at the lower end for resting on a floor and a thread at the upper end for said nut; wherein the inner tube comprises a bearing for securing to the ceiling of a slab and a plurality of holes for fitting said shaft and holding the inner tube within the outer tube. In one embodiment, the arm comprises: a rail with a limit stop point on the rail; a trolley to slide in the rail and support the lifting device.

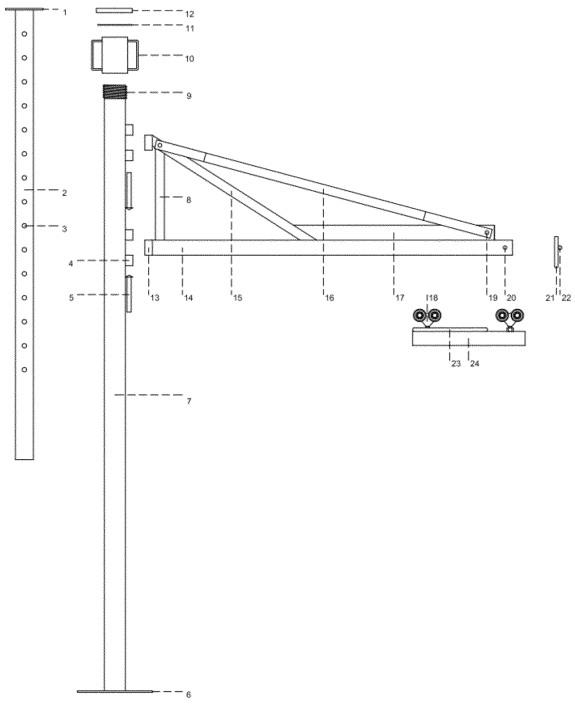

Fig. 1

EP 4 129 886 A1

Description

Technical Field

[0001] The present disclosure refers to a metal gantry for a lifting device suitable for the transport of materials in works. This disclosure is able to be applied when mounting a winch or a pulley on a window, balcony, between two "floor and ceiling" slabs, or even on a stairwell is intended, in order to raise or lower materials. The present disclosure refers to a metal gantry for transporting materials in works.

Background

[0002] Conventional solutions in the market are not adapted to situations covered by the present embodiment, due to space and ease of handling. This is because it would be necessary to mount a structure in round iron tubes with iron clamps like those used in scaffold tubes.

[0003] A possible alternative of the present disclosure will be building a wooden structure, using beams, joists, screws and nails, to fix the winch or the pulley. However, it will always take at least two people to carry out this assembly, thus wasting time and money.

[0004] One of the problems with these structures is that when it suddenly starts raining, water may enter through the window, preventing it to be closed with the structure assembled, and thus dismantle the structure as soon as possible, since it crossed the window opening from the inside to the outside, where the winch or pulley was in turn fixed.

[0005] Another even bigger problem is that when there are only two people on the work site, and for some reason one of them has to be absent from the work site, either to get materials or any other situation and, meanwhile, it starts raining, it becomes very difficult to dismantle the structure. That happens because since it takes two people to dismantle the prior art structures, in such cases water often enters and causes some damage, especially when the floor is made of wood and is irreplaceable.

[0006] Another difficulty found in prior art solutions is that as the winch or pulley is fixed to the outside of the structure facing outwards, certain difficulties are created in pulling materials into the work site, especially when the weight exceeded 25 to 30 kg.

[0007] BRPI0505135A describes a portable combined crane, composed of a vertical column trolley, a cross beam and an electric hoist. Wherein the electric winch is arranged on the cross beam; a hook is arranged on the electric hoist. This document is characterized in that: the portable combined crane adopts a detachable combinable structure; a counterweight bearing structure which is arranged at the rear end of the cross beam; the vertical column trolley and the scale bearing structure are supported on the floor and the ceiling respectively.

[0008] Some of the sector's competitors, but only with solutions/products in the conventional format:

- SIRL (https://sirl.pt/index.php);
- HKD (https://hkdproducts.com/shop/hkd-portable-crane-with-grooved-winch-three-phase-hkd-30-508/).

[0009] These facts are described in order to illustrate the technical problem solved by the embodiments of the present document.

General Description

[0010] The present disclosure refers to a metal gantry for a lifting device for transporting materials in works, when mounting a winch or a pulley on a window, balcony, between two "floor and ceiling" slabs, or even on a stairwell is intended, to raise or lower materials.

[0011] With the development of the present disclosure it was possible to solve the problems mentioned in the background art at once, since the present disclosure allows an easier, faster and more economical assembly. In addition, a single person is able to transport and assemble this structure, when the working day comes to an end, or if it rains and one intends to close the windows, the operator will only need to remove two pivots and the arm is easily released, thus leaving the space free to close the windows.

[0012] This structure was designed to be assembled between two Slabs (floor and ceiling), the structure is entirely metallic, being composed by: two bases, one for the floor and one for the ceiling, two round tubes, one entering inside the other, a male thread and a nut for adjusting the structure from floor to ceiling, a shaft and a washer, an arm in an Apollo rail with a length of one meter and twenty centimeters, where a trolley will slide wherein the winch or the pulley is fixed, two 125x25x14 3-knot eyes to connect to the tube and to the arm, one F1 Apollo rail, 50x08, 30x08, 30x05 iron bars, 12 rod, 45x3 square tube, two double power- 1 N.35 trolleys.

[0013] How to assemble this structure: this structure was developed to be assembled between two slabs, firstly one should adjust the tubes between the slabs by raising the upper tube until it hits the top slab (ceiling) and then apply the shaft in the hole that best suits, the tubes must be upright, then tighten with the nut to create pressure between the slabs, after this operation just apply the arm with the two pivots, and it is ready to receive the sliding trolley with the winch or the pulley, the arm rotates from zero to one hundred and eighty degrees, being able to work in any of these positions.

[0014] The present embodiment describes a metal gantry for supporting a lifting device for transporting materials, comprising: a telescopic structure comprising an outer tube and an inner tube; an arm rotatably connected to the outer tube, for the displacement of the lifting device transverse to the telescopic structure; a nut for threading at the upper end of the outer tube; a shaft to hold the inner tube within the outer tube in said nut; wherein the outer tube comprises a base at the lower end for resting

on a floor and a thread at the upper end; wherein the inner tube comprises a bearing for securing to the ceiling of a slab and a plurality of holes for fitting said shaft and holding the inner tube within the outer tube.

[0015] In one embodiment, the metal gantry for supporting a lifting device according to the preceding claim wherein the arm comprises: a rail with a limit stop point on the rail; a trolley to slide in the rail and support the lifting device.

[0016] In one embodiment, the arm comprises: a rail and a trolley to slide in the rail and support the lifting device.

[0017] In one embodiment, the arm comprises: a lower connection point of the rail to the outer tube; an upper connection point of the arm to the outer tube wherein the connection points are connected to each other by a beam.

[0018] In one embodiment, the arm further comprises a primary diagonal bar fixed between the upper point and a central point on the rail.

[0019] In one embodiment, the arm comprises a supporting bar longitudinally extended along the rail between the central point and the limit stop point of the rail and further a secondary diagonal bar between the upper point and the limit stop point of the rail.

[0020] In one embodiment, the limit stop point includes a ring and a screw-nut to allow the application of a pulley and to prevent the trolley from leaving the rail.

[0021] In one embodiment, the nut comprises two side handles.

[0022] In one embodiment, the arm is connected to the outer tube through an eye and a shaft at each of the lower and upper points.

[0023] In one embodiment, the trolley comprises a handle.

[0024] In one embodiment, the base is between 150 - 350 mm by 200 - 350 mm by 4-6 mm, preferably 250 mm by 250 mm by 5 mm.

[0025] In one embodiment, the outer tube is between 1900 - 2500 mm by 60 - 80 mm by 2 - 4 mm, preferably 2000 mm by 70 mm by 3 mm.

[0026] In one embodiment, the inner tube is between 1400 - 2000 mm by 50 - 70 mm by 2 - 4 mm, preferably 1500 mm by 60.3 mm by 2.9 mm.

[0027] In one embodiment, the beam is between 200 - 400 mm by 20 - 40 mm by 7 - 10 mm, preferably 300 mm by 30 mm by 8 mm.

[0028] In one embodiment, the primary diagonal bar is between 600 - 860 mm by 20 - 40 mm by 7 - 10 mm, preferably 650 mm by 30 mm by 8 mm.

[0029] In one embodiment, the supporting bar is between 500 - 1120 mm by 40 - 60 mm by 7 - 10 mm, preferably 670 x 50 x 8 mm.

[0030] In one embodiment, the secondary diagonal bar is between 1100 - 2000 mm by 20 - 40 mm by 7 - 10 mm, preferably 1200 mm by 30 mm by 8 mm.

[0031] The present embodiment further describes a method of applying a gantry for supporting a lifting device for transporting materials according to any one of the previous embodiments, comprising: joining said telescopic structure; adjusting the base to the floor and the bearing on the ceiling of a slab; holding the inner tube within the outer tube with the shaft; threading the nut and fitting the arm into the outer tube.

Brief Description of the Figures

[0032] For an easier understanding of the present disclosure, figures are herein attached, which represent preferred embodiments which however are not intended to limit the object of the present disclosure.

Figure 1: Side view of an embodiment of the metal structure, wherein:

(1) represents the welded base bearing to the ceiling;
(2) represents the upper tube for adjusting height;
(3) represents the hole for fixing the shaft 12;
(4) represents the eye;
(5) represents the shaft for connecting eye 4 with 13;
(6) represents the welded base bearing to the floor;
(7) represents the structural support tube;
(8) represents the structural bar;
(9) represents the male thread welded to the tube;
(10) represents the adjustment nut;
(11) represents the washer;
(12) represents the shaft for locking tube 2;
(13) represents the eye;
(14) represents the apollo rail;
(15) represents the structural bar;
(16) represents the removable structural base;
(17) represents the structural bar;
(18) represents the F1 N.35 double wheel;
(19) represents the screw with nut;
(20) represents the hole for fixing ring 21;
(21) represents the ring;
(22) represents the screw for fixing ring 21;
(23) represents the handle for sliding the winch;
(24) represents the square tube for fixing the winch.

Figure 2: Left side view of an embodiment of the present disclosure with a minimum 0° position.

Figure 3: Front view of an embodiment of the present disclosure with a 90° position.

Figure 4: Right side view of an embodiment of the present disclosure with a maximum 180° position.

Detailed Description

[0033] The present disclosure describes a metal gantry for supporting a lifting device for transporting materials.

[0034] **Figure 1** shows an embodiment of a metal gantry for supporting a lifting device for transporting materials comprising: a telescopic structure comprising an outer tube (7) and an inner tube (2); an arm rotatably connected to the outer tube (7), for the displacement of the lifting device transverse to the telescopic structure; a nut (10) for threading at the upper end of the outer tube (7); a shaft (12) for holding the inner tube (2) within the outer tube (7) in said nut (10); wherein the outer tube (7) comprises a base (6) at the lower end for resting on a floor and a thread (9) at the upper end; wherein the inner tube (2) comprises a bearing (1) for securing to the ceiling of a slab and a plurality of holes (3) for fitting said shaft (12) and holding the inner tube (2) within the outer tube (7).

[0035] In one embodiment, the arm may comprise a rail (14) with a limit stop point on the rail; a trolley (24) for sliding in the rail (14) and supporting the lifting device.

[0036] In one embodiment, the arm may comprise a lower connection point (13) of the rail (14) to the outer tube (7) and an upper connection point of the arm to the outer tube (7) wherein the connection points are connected to each other by a beam (8).

[0037] In one embodiment, the upper point is connected by a primary diagonal bar (15) fixed between the upper point and a central point on the rail.

[0038] In one embodiment, the arm comprises a supporting bar (17) longitudinally extended along the rail between the central point and the limit stop point of the rail.

[0039] In one embodiment, the arm further comprises a secondary diagonal bar (16) between the upper point and the limit stop point of the rail.

[0040] In one embodiment, the limit stop point comprises a ring (21) and a screw-nut (22) to allow the application of a pulley and to prevent the trolley (24) from leaving the rail (14).

[0041] In one embodiment, the nut (10) comprises two side handles.

[0042] In one embodiment, the arm is connected to the outer tube (7) through an eye (4) and a shaft (5) at each of the lower and upper points.

[0043] In one embodiment, the trolley comprises a handle (23).

[0044] **Figure 2** shows a left side view of an embodiment of the present disclosure with a minimum 0° position.

[0045] **Figure 3** shows a front view of an embodiment of the present disclosure with a 90° position.

[0046] **Figure 4** shows a right side view of an embodiment of the present disclosure with a maximum 180° position.

[0047] The term "comprises" or "comprising" when used herein is intended to indicate the presence of the features, elements, integers, steps and components mentioned, but does not preclude the presence or addition of one or more other features, elements, integers, steps and components, or groups thereof.

[0048] The embodiments described are combinable with each other. The present invention is of course in no way restricted to the embodiments described herein and a person of ordinary skill in the art can foresee many possibilities of modifying it and replacing technical features with equivalents depending on the requirements of each situation as defined in the appended claims. The following claims define further embodiments of the present description.

Claims

1. Metal gantry for supporting a lifting device for transporting materials, comprising:

   a telescopic structure comprising an outer tube and an inner tube;
   an arm rotatably connected to the outer tube, for the displacement of the lifting device transverse to the telescopic structure;
   a nut for threading at the upper end of the outer tube;
   a shaft to hold the inner tube within the outer tube in said nut;
   wherein the outer tube comprises a base at the lower end for resting on a floor and a thread at the upper end for said nut;
   wherein the inner tube comprises a bearing for securing to the ceiling of a slab and a plurality of holes for fitting said shaft and holding the inner tube within the outer tube;
   wherein the arm comprises: a rail;
   a trolley to slide in the rail and support the lifting device.

2. Metal gantry for supporting a lifting device according to the preceding claim, wherein the rail comprises a limit stop point on the rail.

3. Metal gantry for supporting a lifting device according to any one of the preceding claims, wherein the arm comprises:

   a lower connection point of the rail to the outer tube;
   an upper connection point of the arm to the outer tube wherein the connection points are connected to each other by a beam.

4. Metal gantry for supporting a lifting device according to any one of the preceding claims, wherein the arm further comprises a primary diagonal bar fixed between the upper point and a central point on the rail.

5. Metal gantry for supporting a lifting device according to the preceding claim, wherein the arm comprises a supporting bar longitudinally extended along the rail between the central point and the limit stop point of the rail.

6. Metal gantry for supporting a lifting device according to any one of the preceding claims, wherein the arm further comprises a secondary diagonal bar between the upper point and the limit stop point of the rail.

7. Metal gantry for supporting a lifting device according to any one of the preceding claims, wherein the limit stop point comprises a ring and a screw-nut to allow a pulley to be applied and to prevent the trolley from leaving the rail.

8. Metal gantry for supporting a lifting device according to any one of the preceding claims, wherein the nut comprises two side handles.

9. Metal gantry for supporting a lifting device according to any one of the preceding claims, wherein the arm is connected to the outer tube by means of an eye and a shaft at each of the lower and upper points.

10. Metal gantry for supporting a lifting device according to any one of the preceding claims, wherein the trolley comprises a handle.

11. Metal gantry for supporting a lifting device according to any one of the preceding claims, wherein the base is between 150 - 350 mm by 200 - 350 mm by 4-6 mm, preferably 250 mm by 250 mm by 5 mm.

12. Metal gantry for supporting a lifting device according to any one of the preceding claims, wherein the outer tube is between 1900 - 2500 mm by 60 - 80 mm by 2 - 4 mm, preferably 2000 mm by 70 mm by 3 mm.

13. Metal gantry for supporting a lifting device according to any one of the preceding claims, wherein the inner tube is between 1400 - 2000 mm by 50 - 70 mm by 2-4 mm, preferably 1500 mm by 60.3 mm by 2.9 mm.

14. Metal gantry for supporting a lifting device according to any one of the preceding claims, wherein the beam is between 200 - 400 mm by 20 - 40 mm by 10 - 7 mm, preferably 300 mm by 30 mm by 8 mm.

15. Metal gantry for supporting a lifting device according to any one of the preceding claims, wherein the primary diagonal bar is between 600 - 860 mm by 20 - 40 mm by 7 - 10 mm, preferably 650 mm by 30 mm by 8 mm.

16. Metal gantry for supporting a lifting device according to any one of the preceding claims, wherein the supporting bar is between 500 - 1120 mm by 40 - 60 mm by 7-10 mm, preferably 670 mm by 50 mm by 8 mm.

17. Metal gantry for supporting a lifting device according to any one of the preceding claims, wherein the secondary diagonal bar is between 1100 - 2000 mm by 20 - 40 mm by 7 - 10 mm, preferably 1200 mm by 30 mm by 8 mm.

18. Method for applying a gantry for supporting a lifting device for transporting materials according to any one of the preceding claims, comprising:

joining said telescopic structure;
adjusting the base to the floor and the bearing on the ceiling of a slab;
holding the inner tube in the outer tube with the shaft;
threading the nut;
fitting the arm into the outer tube.

19. Use of a gantry for supporting a lifting device according to claims 1-17 for transporting materials in remodeling works, civil construction works, infrastructure works and urbanizations, or combinations thereof.

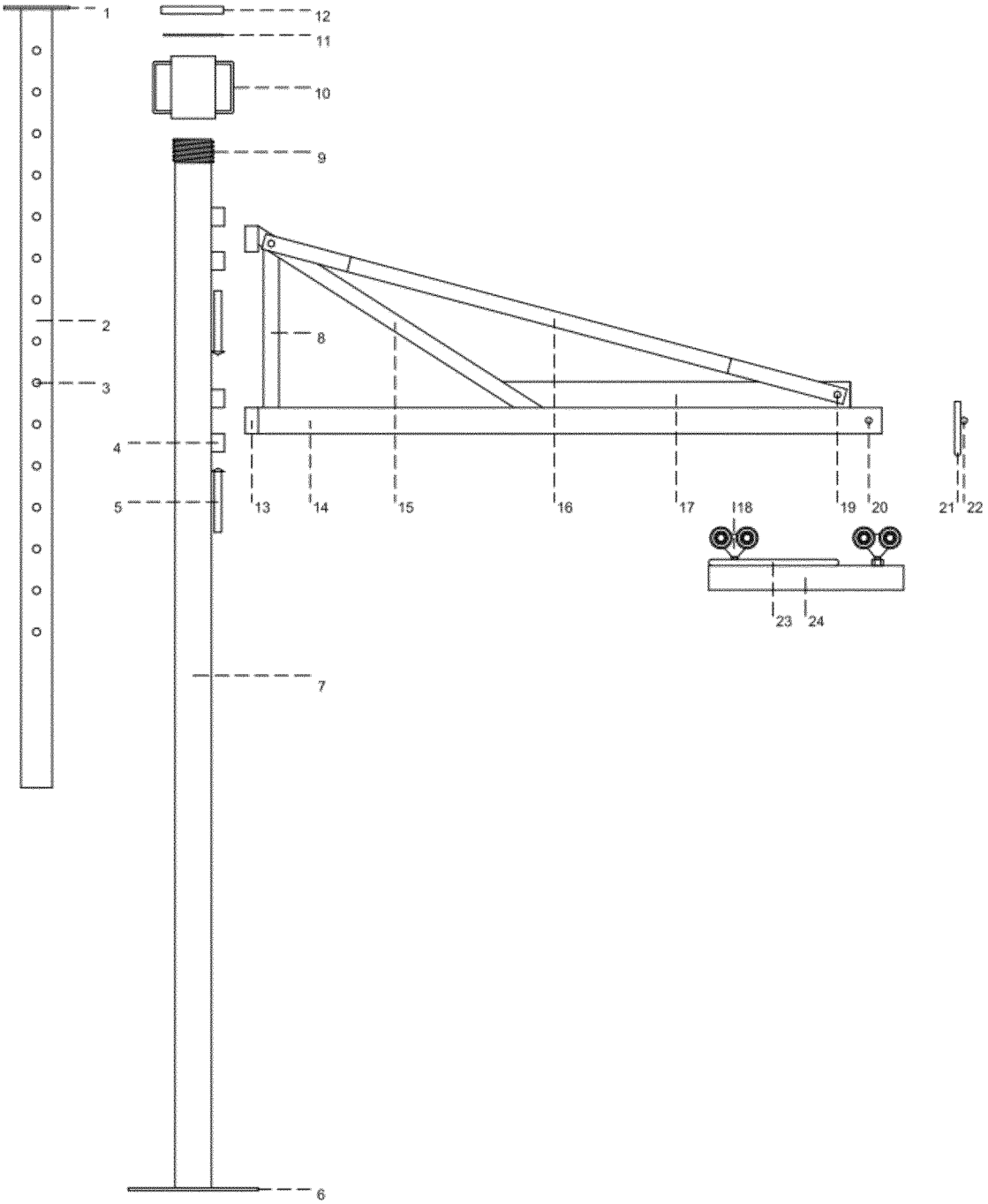

Fig. 1

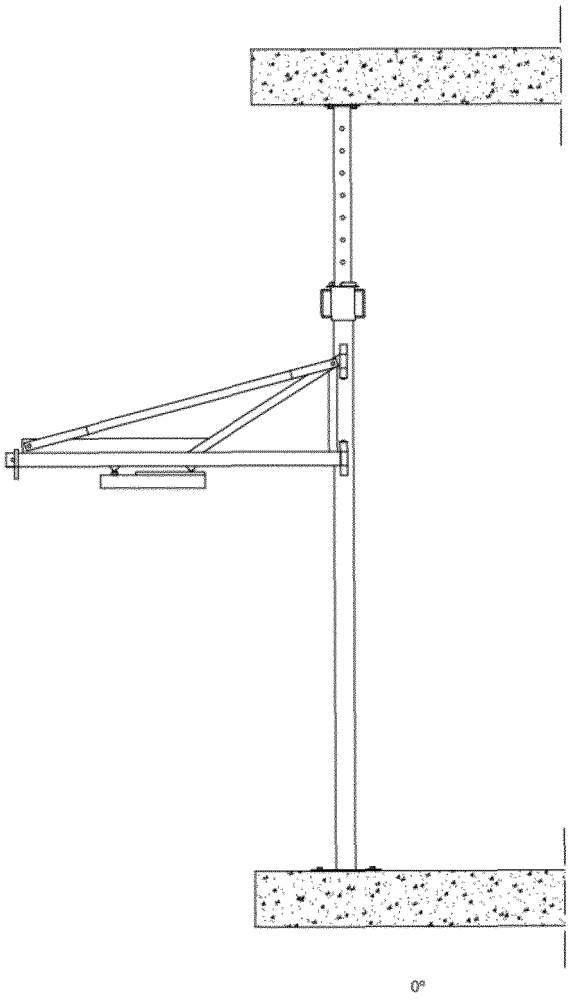

Fig. 2

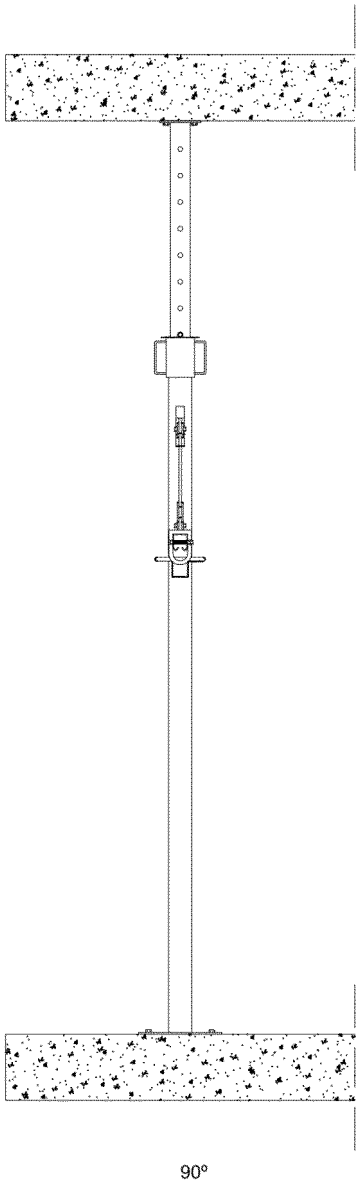

Fig. 3

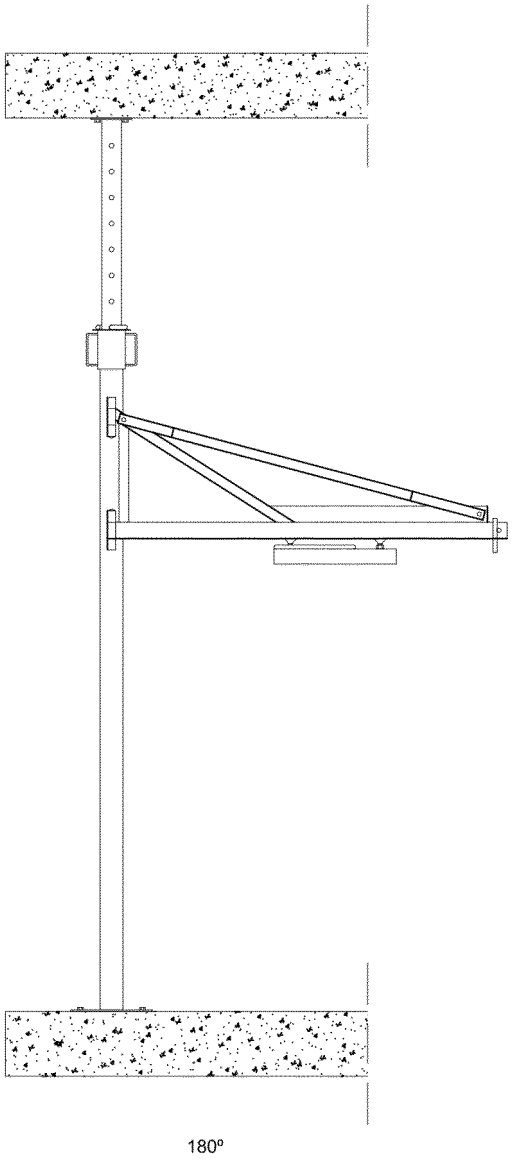

Fig. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2021/052365

A. CLASSIFICATION OF SUBJECT MATTER
INV. B66C23/20 B66C23/02
ADD.

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)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 4 096 952 A (DIGGS RICHARD E) 27 June 1978 (1978-06-27) column 2, line 39 - column 6, line 33 column 6, line 34 - column 6, line 68 figures -----	1,11-19 2,7,10
X	JP S49 43958 U (UNKNOWN) 17 April 1974 (1974-04-17) abstract; figures -----	1,8,18, 19
X	DE 38 06 599 C1 (UNKNOWN) 21 September 1989 (1989-09-21) paragraph [0002] paragraph [0021] - paragraph [0023] paragraph [0024] - paragraph [0026] figures ----- -/--	1,3-6,8, 9,18,19

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
13 July 2021	23/07/2021

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Özsoy, Sevda

Form PCT/ISA/210 (second sheet) (April 2005)

page 1 of 2

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2021/052365

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2000 335884 A (JS CORP; SANKYO ALU IND) 5 December 2000 (2000-12-05) abstract; figures	2,7
Y	WO 2011/015527 A1 (DEMAG CRANES & COMPONENTS GMBH [DE]; PERSICO GIULIANO [DE] ET AL.) 10 February 2011 (2011-02-10) figure 1	10

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2021/052365

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4096952	A 27-06-1978	NONE	
JP S4943958	U 17-04-1974	NONE	
DE 3806599	C1 21-09-1989	NONE	
JP 2000335884	A 05-12-2000	JP 3432455 B2	04-08-2003
		JP 2000335884 A	05-12-2000
WO 2011015527	A1 10-02-2011	DE 102009036480 A1	17-02-2011
		WO 2011015527 A1	10-02-2011

Form PCT/ISA/210 (patent family annex) (April 2005)