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(54) **METALLIC SUPPORT FOR RIGGING**

(57) This disclosure refers to a metallic support for rigging used in building industry systems, comprising a steel bar provided with "C"-shaped metallic supports

welded to it, in order to deliver increased mechanical resistance, leading to easier use and decreasing losses caused by damage during use or transportation.

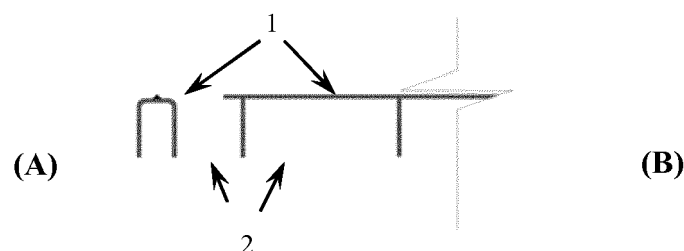


FIGURE 1

EP 3 486 395 A1

Description**TECHNICAL FIELD**

- 5 [0001] This disclosure refers to building systems, more specifically to devices for use in building systems, precisely a metallic support for rigging formed by a bar including metallic supports for use in building industries.

BACKGROUND

- 10 [0002] In the current scenario, the use of support systems for rigging in building industry is characterized by the predominance of plastic supports, which support the rigging through wire fastening. Such devices require a great effort for application, as they need to be fixed to the support base in order to provide proper support to the rigging.
- [0003] The existing metallic options feature difficulties related to sustaining larger loads, aside from the high risk of damage to the support surface, since its structure is relatively fragile, susceptible to bending when subjected to common utilization efforts, and lacking any protection that prevent excessive contact of the metallic parts with the support surface of the slab.
- 15 [0004] Document MU8502688 teaches a plastic spacer used in building industry for positioning welded meshes or rigging in the manufacture of industrial floors or concrete paving with a wing-shaped building format, which leads to low manufacturing cost and renders excellent mechanical resistance, practical utilization and optimal transportation, storage and handling, since it allows accommodation of the pieces between each other.
- [0005] Patent FR2944302 shows a metallic linkage element for meshes or metallic frames to be used in concrete frames, in order to obtain reinforced concrete slabs or horizontal walls.
- 20 [0006] Patent US4056908 explains the compound action of open-layer steel beams, providing support for beams and girders, and the reinforced connection of the concrete slab, where parts of the upper vortex of the steel beam layer protrude through the upper sections of the cross member rope and through the openings provided on the model of the metallic sheet place over said beams prior to the concrete pouring, and a continuous cylinder-shaped rod fixed near the tip of each flap element that protrudes in parallel to the longitudinal axis of the beam and a covered reinforcement wire mesh between the shafts.
- 25 [0007] Patent US5729949 shows a support for sustaining and spacing reinforcement bars, featuring a hollow tapered body for stacking, a flat base for support, an opening to allow the cement flow inside and around the support, and the notches on the upper surface of the support to hold the bars in the desired position.
- 30 [0008] There are some solutions used in the market that resemble the support for rigging proposed herein, but with different designs and functionality, as may be seen in:

- 35 a) <http://blogdopetcivil.com/2012/01/20/lajes-trelicadas>
b) <http://www.trelicon.com.br/quem-somos>

- [0009] The standard solution, using standard plastic supports, is already widely known and used, but lacks strength and easy handling, as may be seen, for example, in <http://www.aecweb.com.br/prod/e/apoio-para-cordoalha-e-posicionador-de-armadura-negativa-em-lajes-apc-1162-15807>. Therefore, there are no devices that feature the same configuration and advantages in building, as well as easy operation, such as the innovation presented herein.
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DESCRIPTION OF THE FIGURES

- 45 [0010] Example embodiments of the disclosure will now be described by way of example only and with reference to the accompanying drawings, in which:

Figure 1 shows a front view (A) and a side view (B) of the metallic support, where the metallic shaft (1) is seen positioned on the metallic support (2).

- 50 Figure 2 shows a perspective view of the metallic support in a configuration for use, where the metallic shaft (1) is featured positioned on the various metallic supports (2) properly spaced throughout the shaft (1).

DETAILED DESCRIPTION

- 55 [0011] The examples, materials and systems described herein provide, *inter alia*, rigging supports and rigging systems. These and other aspects, features and advantages of the disclosure or of certain embodiments of the disclosure will be further understood by those skilled in the art from the following description of example embodiments. In the following description of various examples, reference is made to the accompanying drawings, which form a part hereof. It is to be

understood that other modifications may be made from the specifically described components and systems without departing from the scope of the present disclosure.

[0012] It is also to be understood that the specific material, systems, devices and processes illustrated in the attached drawings, and/or described in the following specification, are simply exemplary embodiments. Hence, specific dimensions and other physical characteristics relating to the embodiments disclosed herein are not to be considered as limiting. Moreover, the figures of this disclosure may represent the scale and/or dimensions according to one or more embodiments, and as such contribute to the teaching of such dimensional scaling. However, the disclosure herein is not limited to the scales, dimensions, proportions, and/or orientations shown in the figures.

[0013] This disclosure refers to a metallic support for rigging used in building industry, featuring an innovative forming that enables replacement of the current solutions with significant advantages in terms of mechanical resistance and easy operation.

[0014] The metallic supports serve for support of prestressing cables, negative reinforcements and structural fittings in a configuration where the metallic supports (2) are welded to the upper metallic bar (1), allowing easier execution of the assembly, compared to solutions commonly employed - the plastic support, since it dismisses the need for fixing all supports on the mesh through wire fastening or shaped nails, and subsequent fixation of the metallic bar on the plastic supports.

[0015] In the solution proposed herein, little fastening is required between the positive mesh and the rigging support bar itself on both extremities of the bar and one on the center.

[0016] The metallic supports are more resistant than plastic supports, thus being safer, as they do not break after the concrete pouring, decreasing losses caused by damage during use or transportation.

[0017] Its manufacturing may be done through welding of the metallic supports (2) to a steel bar (1) for supporting the rigging. The supports (2) have a semicircle or substantially rectangular shape with rounded edges and one open side, similar to, e.g., a "C", in which the dimensions of the bar (1) and the supports (2) vary according to the height to be provided by the set, which also affects the thickness of the supports (2) and the bar (1).

[0018] The curved shape, e.g. a "C" shape, a parabolic shape, an arched shape, a semicircular shape, etc., of the support (2) allows increased mechanical resistance when compared to similar market versions, which are "V" shaped, in other words, by straight shafts welded to the steel bar.

[0019] The supports (2) are welded beneath the steel bar (1) with a preferable thickness of approximately 10 mm (where in other examples, the thickness may be about 5-15 mm, about 8-12 mm, about 10 mm or more, about 8 mm or more, or about 12 mm or less, or other sizes), but may be easily adapted for different uses with variable spacing along the entire bar or one or more portions of the bar, according to the load to be sustained, though normally around 400 mm (where in other examples, the supports may be spaced at least 400 mm apart, at least 300 mm apart, between about 350 and 450 mm, about 500 mm or less, 750 mm or more, or others). This distance between the supports (2) is established in order to prevent deformations on the support bar (1) upon assembly and concrete pouring; the support bar (1) is specified on an execution project of the prestressing service.

[0020] Typically, the support bar (1) has 3 meters length for easy transportation and application as per market practice, avoiding losses due to sectioning at the time of execution of the civil work.

[0021] For more safety, in order to avoid direct contact between the steel of the support (2) and the base of the frame, the "C"-shaped bases of the support (2) may be painted with epoxy paint or coated with a plastic end sheet. This way, undesired marks on the slab or on the finished beam due to steel corrosion are avoided.

[0022] Typically, the placement of metallic supports is started after the positive fitting is concluded, prior to the launch of prestressing rigging and negative fittings. This allows for a quicker assembly, since none of the materials need to be lifted for the installation to take place.

[0023] Respecting the distance between each ordinate (specified in the project), the metallic supports required may be identified by the desired height. For easy identification and use, the supports are painted in different colors, for size distinction according to a color chart.

[0024] For comparison purposes regarding practicality between metallic and plastic supports, the chart below compares each alternative by taking into account a 3-meter bar with plastic supports and a 3-meter bar with metallic supports:

Fastened plastic support	Nailed plastic support		Metallic support
Amount of fastenings ¹	Amount of fastenings ²	Amount of nails ³	Amount of fastenings
12	10	48	4

[0025] Where:

1 - considering a safety amount of one support every 25 cm and the fastening between the support shaft and the

positive mesh;

2 - considering a safety amount of one support every 30 cm and the fastening between the metallic shaft and the positive mesh;

3 - four nails per support to avoid breaks during the concrete pouring.

[0026] After fixation of the metallic supports, the launching of the rigging over the bars (1) may start, and then, the negative fittings after the rigging are fixed on the supports.

[0027] For cases where metallic hoops are used as supports, the use of metallic supports provided herein is more advantageous, as its welding fixation is safer and its base is coated with epoxy painting, which prevents any marks on the finished slab.

[0028] Accordingly, there is disclosed in accordance with the invention in a first aspect and embodiment: A metallic rigging support comprising: a metallic bar (1); a plurality of metallic supports (2) connected to the bar, wherein said supports (2) comprise an arched, semicircular, parabolic or substantially rectangular exterior shape defining an opening on the bottom of the support, and a plurality of lower ends on each side of the opening, wherein the supports are positioned in a spaced manner along said metallic bar (1), in order to provide proper support to each type of use provided for in a building project; and a plurality of protective elements on the lower ends.

[0029] In an embodiment of the first aspect there is disclosed the metallic rigging support, wherein the plurality of supports are welded to the bar.

[0030] In an embodiment of the first aspect there is disclosed the metallic rigging support, wherein the protective elements comprise a paint, a thermoplastic covering, or both. In a preferred embodiment of the first aspect there is disclosed the metallic rigging support, wherein the paint is an epoxy paint.

[0031] In an embodiment of the first aspect there is disclosed the metallic rigging support, wherein the supports are regularly spaced along the metallic bar.

[0032] In an embodiment of the first aspect there is disclosed the metallic rigging support, wherein the supports have rounded exterior edges.

[0033] In an embodiment of the first aspect there is disclosed the metallic rigging support, wherein the exterior shape is substantially in the shape of a "C".

[0034] In an embodiment of the first aspect there is disclosed the metallic rigging support, wherein the supports are spaced at least about 400 mm apart along the bar.

[0035] In an embodiment of the first aspect there is disclosed the metallic rigging support, wherein the supports are spaced at least about 300 mm apart along the bar.

[0036] In an embodiment of the first aspect there is disclosed the metallic rigging support, wherein the supports are spaced at least about 750 mm apart along the bar.

[0037] In an embodiment of the first aspect there is disclosed the metallic rigging support, wherein the bar is about 3 meters or less in length.

[0038] In a second aspect of the invention there is disclosed a rigging system comprising one or more metallic rigging supports according to any of the embodiments of the first aspect.

[0039] In an embodiment of the second aspect there is disclosed a rigging system comprising one or more metallic rigging supports, further comprising a rigging fixed to the metallic rigging supports.

[0040] In an embodiment of the second aspect there is disclosed a rigging system comprising one or more metallic rigging supports, further comprising a concrete material poured around the one or more metallic rigging supports.

[0041] This innovation is not limited to the representations commented or illustrated herein, and should be construed in its full scope. Several modifications and other representations of the disclosure may be perceived by those skilled in the art to which this innovation pertains, with the benefit of the knowledge provided in previous descriptions and attached drawings. Furthermore, it is understood that the disclosure is not limited to the specific form presented and that modifications and other forms are considered within the scope of the attached claims. Although specific terms are used herein, these are only used in a generic and descriptive manner, not with limiting purposes.

Claims

1. A metallic rigging support comprising:

a metallic bar (1);

a plurality of metallic supports (2) connected to the bar, wherein said supports (2) comprise an arched, semi-circular, parabolic or substantially rectangular exterior shape defining an opening on the bottom of the support, and a plurality of lower ends on each side of the opening, wherein the supports are positioned in a spaced manner along said metallic bar (1), in order to provide proper support to each type of use provided for in a

building project; and
a plurality of protective elements on the lower ends.

2. The metallic rigging support of claim 1, wherein the plurality of supports are welded to the bar.
3. The metallic rigging support of either of claims 1 or 2, wherein the protective elements comprise a paint, a thermo-plastic covering, or both.
4. The metallic rigging support of claim 3, wherein the paint is an epoxy paint.
5. The metallic rigging support of any of claims 1 to 4, wherein the supports are regularly spaced along the metallic bar.
6. The metallic rigging support of any of claims 1 to 5, wherein the supports have rounded exterior edges.
7. The metallic rigging support of any of claims 1 to 6, wherein the exterior shape is substantially in the shape of a "C".
8. The metallic rigging support of any of claims 1 to 7, wherein the supports are spaced at least about 400 mm apart along the bar.
9. The metallic rigging support of any of claims 1 to 8, wherein the supports are spaced at least about 300 mm apart along the bar.
10. The metallic rigging support of any of claims 1 to 9, wherein the supports are spaced at least about 750 mm apart along the bar.
11. The metallic rigging support of any of claims 1 to 10, wherein the bar is about 3 meters or less in length.
12. A rigging system comprising one or more metallic rigging supports of any of claims 1 to 11.
13. The rigging system of claim 12, further comprising a rigging fixed to the metallic rigging supports.
14. The rigging system of either claim 12 or claim 13, further comprising a concrete material poured around the one or more metallic rigging supports.

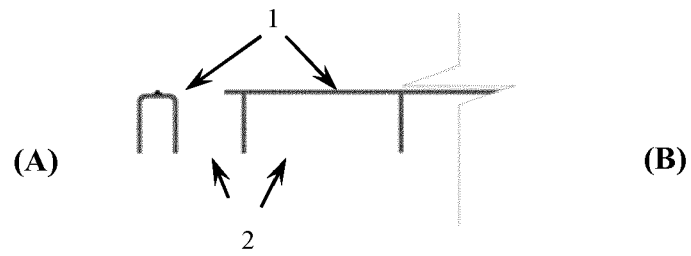


FIGURE 1

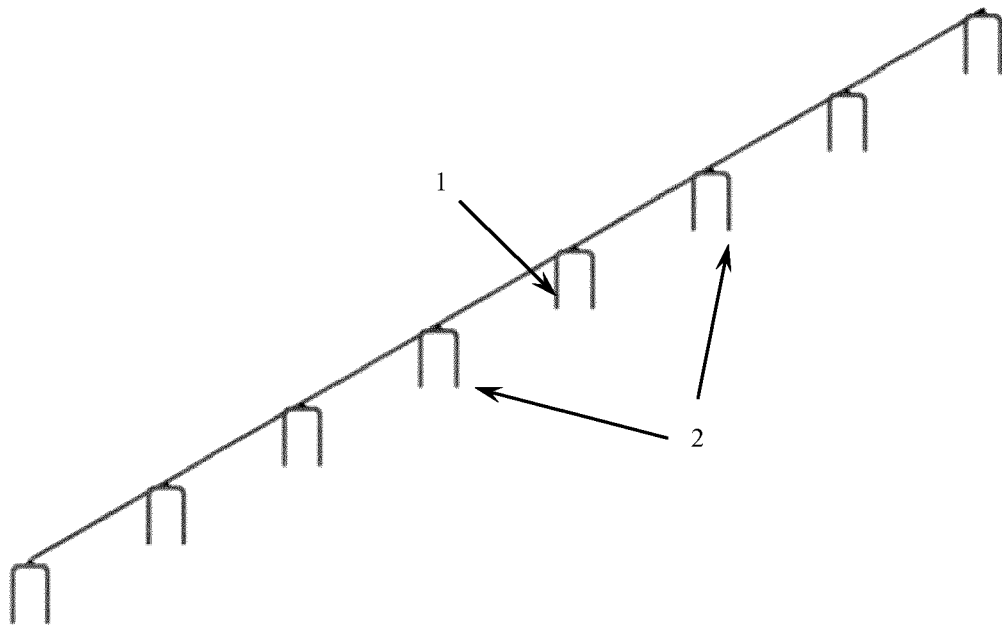


FIGURE 2



EUROPEAN SEARCH REPORT

Application Number
EP 17 20 1884

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EPO FORM 1503 03.82 (P04C01)

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			TECHNICAL FIELDS SEARCHED (IPC)
			E04C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 8 May 2018	Examiner Bauer, Josef
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 17 20 1884

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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08-05-2018

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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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