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(54) **TRANSPORT ANCHOR**

(57) Transport anchor for hollow walls made from a bar with a bent central part (1), the ends of which are passed through openings (4), (5) of a crossbar (3) connecting them rigidly forming arms parallel to each other (6), (7), characterized in that the bar arms (6), (7) are twisted along their axes, while the crossbar is a steel element with a quadrilateral cross-section and has an internal filling in the form of polyurethane foam.

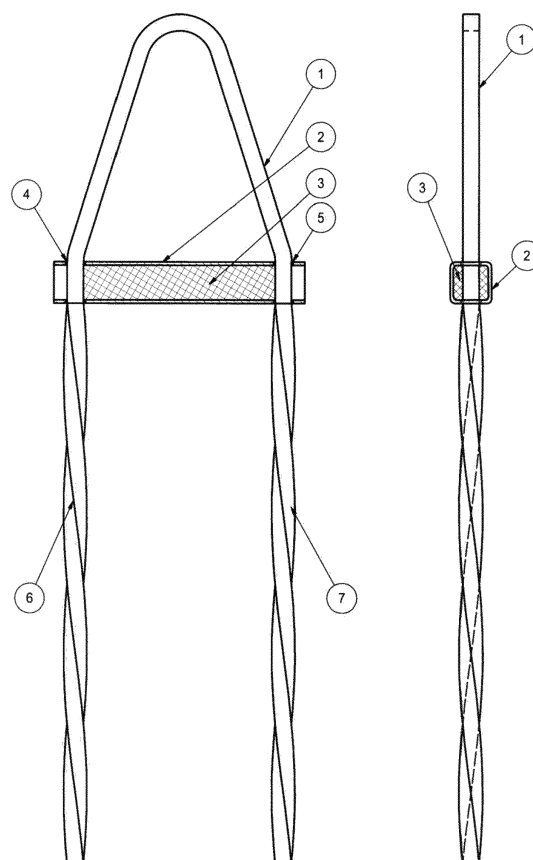


Fig. 1

Description

[0001] The invention relates to a transport anchor for transporting building elements in the form of diaphragm walls with an air gap. The industry is constantly looking for an optimal, durable transport anchor which allows for safe transport of increasingly larger and thus heavier building elements in the form of walls to the construction site.

[0002] The patent description DE102016121271 discloses a transport anchor for double-walled concrete elements. It is made from a bracket shaped in such a way that its arms are mutually parallel and is intended for embedding in double-walled elements, characterized by having anchor arms connected by a crossbar having an adaptive clamping element. According to the invention, the clamping element is made as a thermally insulated hollow body.

[0003] In another transport anchor described in EP 3 029 220 A1, a clamping element in the form of a crossbar is attached by its ends to the arms of the transport anchor by welding. In this case, the clamping element is connected by spot welding. The welding process also locally change and weaken the surrounding material, which decreases stability.

[0004] The transport anchor described in the DE 100 38 249 B4 document also has a clamping element made of steel and welded to the anchor legs. High forces during the transport of double walls to the construction site overload these weak anchor's points, thereby increasing the risk of welds cracking, and subsequently leading to a very likely excessive deformation of the anchor at a later stage.

[0005] In all of the cases mentioned above, the welds may cause the transport anchor to break off from the concrete, which may result in the breakdown of the prefabricated concrete part.

[0006] The object of the invention is to provide a new transport anchor of the said type with even better performance, cheaper in manufacturing while meeting all the technical requirements, and with a structure that does not affect the anchor's load capacity, and therefore making it safe for use on construction sites.

[0007] The subject of the invention is a transport anchor for hollow walls made from a bar with a bent central part, the ends of which are passed through openings made in a crossbar connecting them rigidly forming arms parallel to each other, characterized in that the bar arms are twisted along their axes, while the crossbar is a steel element with a quadrilateral cross-section and has an internal filling in the form of polyurethane foam.

[0008] Preferably, the bar is twisted along the entire length of the transport anchor arms.

[0009] Preferably, the bar is twisted over a specific section of the transport anchor arms.

[0010] Preferably, the transport anchor is made of a steel bar with a quadrilateral cross-section.

[0011] Preferably, the transport anchor is made of a

steel bar with a hexagon cross-section.

[0012] Preferably, the bar arms are twisted 1.5 to 2.5 times for every 100 mm of their length.

[0013] The advantage of a transport anchor for hollow walls with a structure according to the invention is the complete absence of any mechanical interference into the material (welding) from which it is made, making it possible to eliminate ways of joining elements that might weaken its durability, which is of key importance due to the danger of accidents that may occur during transport of such large building materials.

[0014] Furthermore, the optimal anchoring of the element in the wall slab is ensured by embedding in concrete the anchor arms which are twisted along their axes together with the crossbar that connects them.

[0015] Remarkably, it turned out that twisting the bar arms from 1.5 to 2.5 times for every 100 mm of their length changes the internal structure of the steel, which results in an increased bar tensile strength, while maintaining the required plasticity, e.g. at a level consistent with the guidelines of the German standard VDI/BV-BS 6205. However, one arm torsion is equivalent to it being twisted 360° along its axis. The increased tensile strength and the shape of the arms obtained after twisting allow a more secure fixing of the transport anchor according to the invention in concrete, which in turn leads to an increased load capacity of the anchor. Twisting the bar arms themselves causes the anchor element that protrudes from the concrete to have no effect on the original plasticity of the material, which is a very important element due to the nature work for which this part of the transport anchor is designed.

[0016] Twisting only the bar arms around its own axis makes the central part of the bar, and thus also the central part of the anchor that protrudes from concrete, more flexible, as it still possesses the original plasticity of the material, which is a very important parameter due to the nature of work of this particular part of the anchor. During transportation, the anchor deforms at the point of contact with concrete, and due to appropriate flexibility of its central part, cracks in concrete at this point are minimized.

[0017] In addition, twisting the bar arms also allows for better anchoring of the transport anchor according to the invention in concrete.

[0018] Furthermore, twisting the bar protects the anchor's crossbar from changing its position (falling out) without the need to make welded or welded joint. Therefore, the strength of the transport anchor and its load capacity do not get worse.

[0019] By twisting the bar, its structure becomes compressed, which translates into an increase in the transport anchor's load capacity.

[0020] The subject of the invention has been presented in the embodiments and in the drawing in which:

- Fig. 1 shows the front and side view of the transport anchor for hollow walls,

- Fig. 2 shows the transport anchor for hollow walls mounted in a construction element,
- Fig. 3 shows the front and side view of the transport anchor for hollow walls according to the second embodiment,
- Fig. 4 shows the transport anchor for hollow walls, according to the second embodiment, mounted in a construction element.

Embodiment 1

[0021] Transport anchor for hollow walls in the embodiment is made from a bar having a bent central part 1, the ends of which are passed through openings 4, 5 made in a crossbar 3 that connects them rigidly forming arms 6, 7 parallel to each other. The bar arms 6, 7 are twisted axially along their entire length or, in another version, along a given section, while the crossbar 3 is a steel element with a quadrilateral cross-section and has an internal filling in the form of polyurethane foam having thermal insulation properties. The steel bar from which the transport anchor is made has a quadrilateral cross-section or, in another version, a hexagon one.

[0022] At the prefabrication facility, reinforcement and other elements used for the production of walls like mounting anchors, spacers and transport anchor arms 6, 7 are spaced out on the formwork slab in each of the walls forming the hollow construction element respectively. Then the whole is flooded with a thin layer of concrete whereby the anchor arms are permanently joined to the construction element as shown in Fig. 2. During transportation, the anchor deforms at the point of contact with the concrete, but, due to the proper flexibility of the central part 1, any concrete cracks at this point are minimized.

Embodiment 2

[0023] Transport anchor for hollow walls in the embodiment is made from a bar having a bent central part 1, the ends of which are passed through openings 4, 5 made in a crossbar 3 that connects them rigidly forming arms 6, 7 parallel to each other. The bar arms 6, 7 are twisted axially along their entire length or, in another version, along a given section.

[0024] The bar arms 6, 7 are twisted along the entire length, and the bar arms 6, 7 are twisted 1.5 times for every 100 mm of their length (in other embodiments the number of twists equals from 1.5 to 2.5), and one torsion of the arms 6, 7 is equivalent to them being twisted 360° along their axes. Such a number of torsions over the length of 100 mm changes the steel structure, which results in an increased tensile strength of the bar arms, while maintaining the required plasticity.

[0025] Crossbar 3 is a steel element with a quadrilateral cross-section and has an internal filling in the form

of polyurethane foam having thermal insulation properties. The steel bar from which the transport anchor is made has a quadrilateral cross-section or, in another version, a hexagon one.

Claims

1. Transport anchor for hollow walls made from a bar with a bent central part (1), the ends of which are passed through openings (4), (5) made in a crossbar (3) that connecting them rigidly forming arms (6), (7) parallel to each other, **characterized in that** the bar arms (6), (7) are twisted along their axes, while the crossbar is a steel element with a quadrilateral cross-section and has an internal filling in the form of polyurethane foam.
2. Transport anchor according to claim 1, **characterized in that** the bar arms (6), (7) are twisted along their entire length.
3. Transport anchor according to claim 1, **characterized in that** the bar arms (6), (7) are twisted over a section of a specific length.
4. Transport anchor according to any of the claims 1 to 3, **characterized in that** the bar arms (6), (7) are twisted from 1.5 to 2.5 times for every 100 mm of their length.
5. Anchor according to any claims 1 to 4, **characterized in that** it is made from a steel bar with a quadrilateral cross-section.
6. Anchor according to any claims 1 to 4, **characterized in that** it is made from a steel bar with a hexagon cross-section.

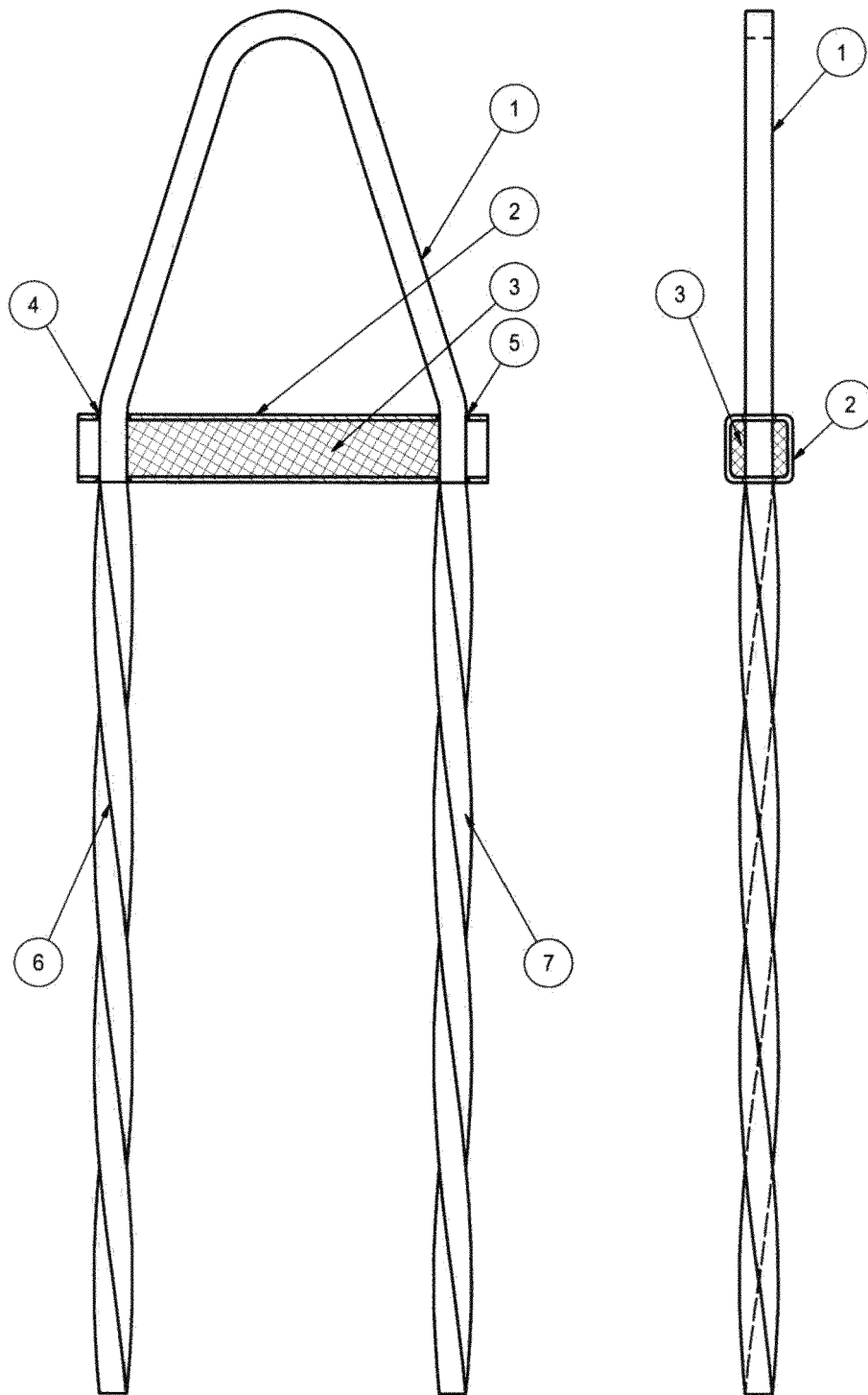


Fig. 1

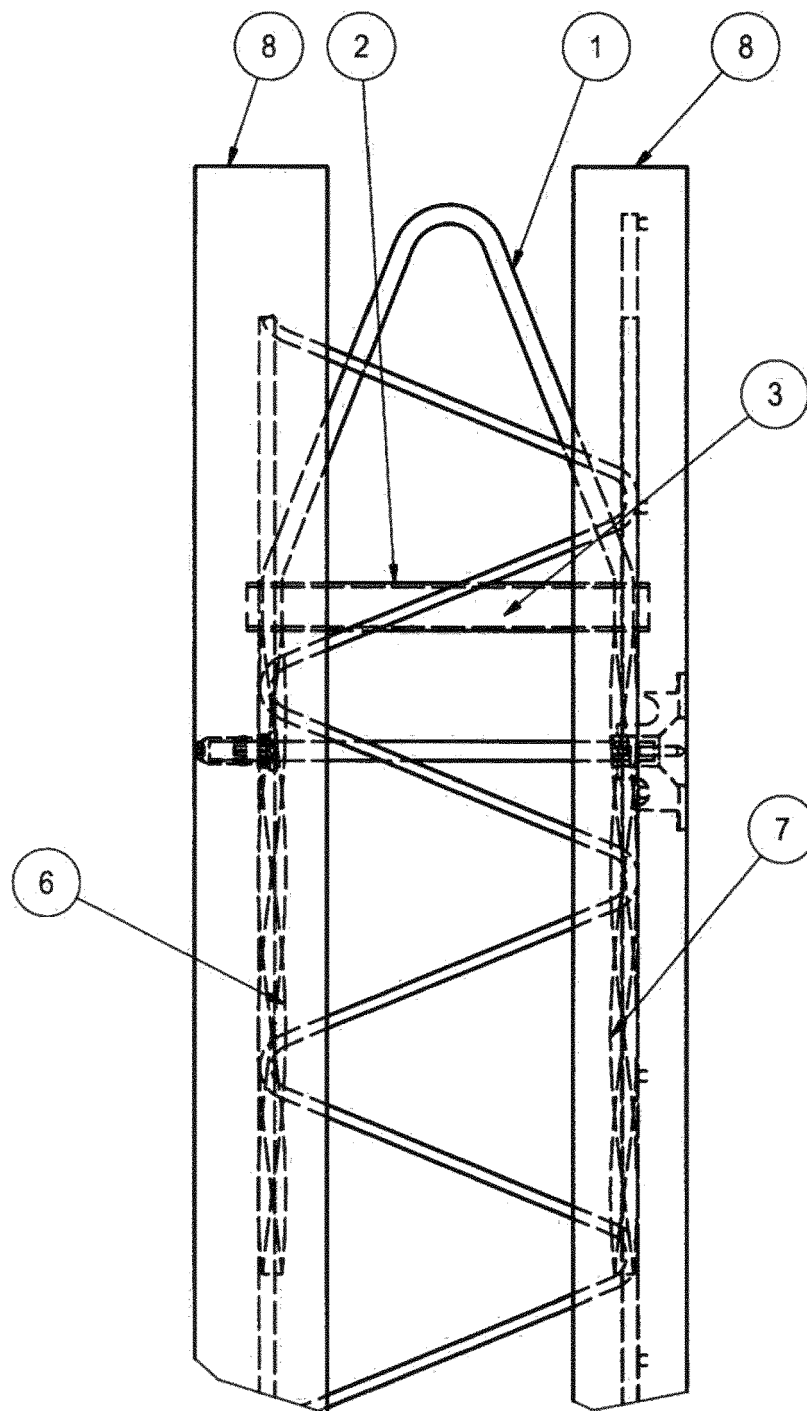


Fig. 2

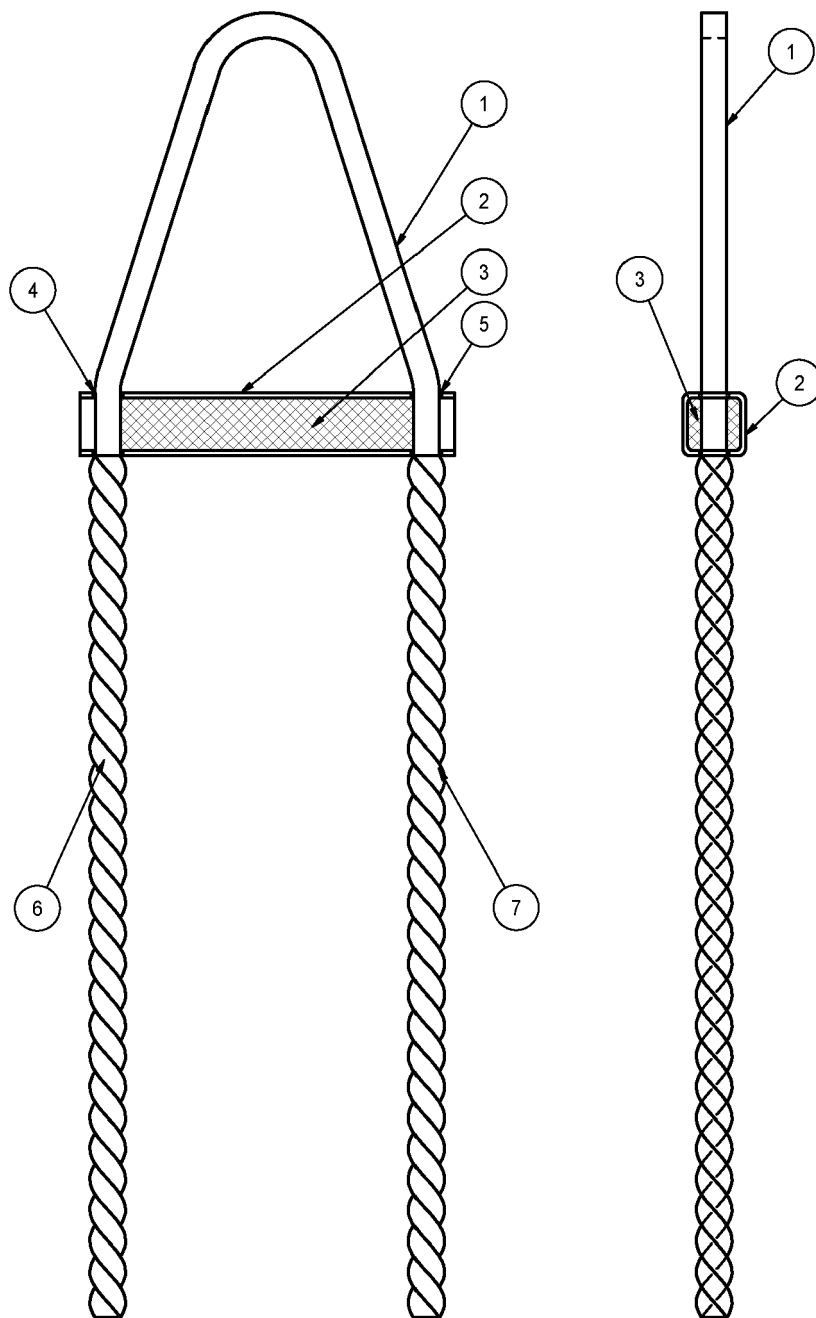


Fig. 3

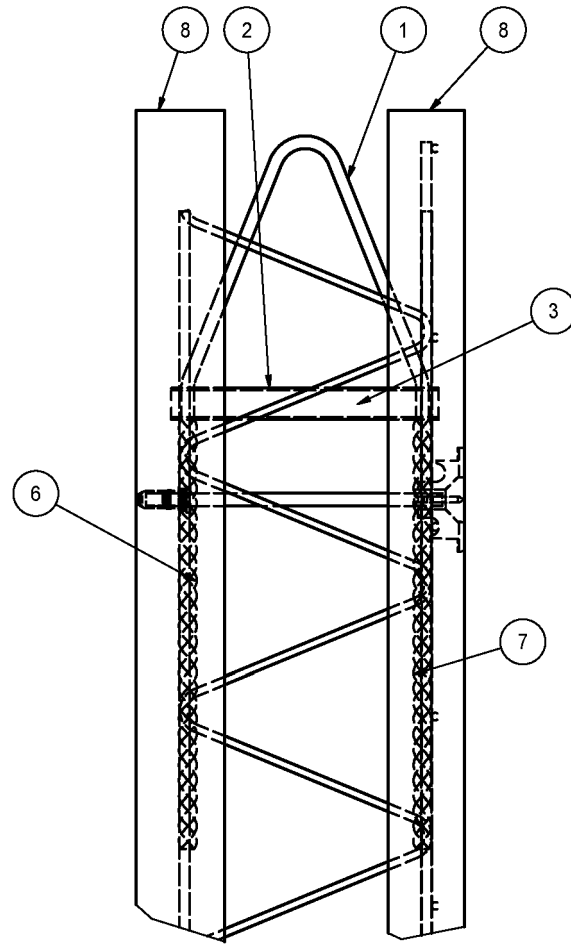


Fig. 4



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Application Number
EP 19 21 9936

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 22 September 2020	Examiner Demeester, Jan
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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