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

(11) **EP 3 859 099 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
04.08.2021 Bulletin 2021/31

(51) Int Cl.:
E04G 21/32 *(2006.01)*

(21) Application number: **20209686.3**

(22) Date of filing: **25.11.2020**

(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: **30.01.2020 PL 43275820**

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(54) **A SAFETY POST, ESPECIALLY FOR WORK AT HEIGHTS**

(57) The anchorage is equipped with at least three supports (3), each of which is a rod with a variable cross-section, provided at both ends with end flat bars (7, 7'), wherein the top end flat bar (7) is fixed to the top flat bar (8) connected in a detachable or non-detachable manner to the common top plate (2), while the bottom end flat bar (7') is fixed to the bottom flat bar (8') fixed in a non-detachable manner to a flat base (1) partially fixed to the roof surface. Each support (3) has at least one contraction (9'), wherein one contraction (9') is arranged approximately at the mid-point of the support (3) length, and the ratio of the total length of the contractions to the remaining length of the rod is between 1:5 and 2:6.

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Description

[0001] The invention relates to a fall protection anchorage for individual protection for persons working at height, especially on the roofs of buildings.

[0002] A wide range of fall protection equipment is known in the art for protecting workers working at height, especially on roofs of buildings of different shapes and structures.

[0003] Polish patent PL 217970 discloses an anchorage designed primarily to be fixed on roofs or walls of buildings, making part of a system in a chain of elements protecting persons working at height. The anchorage is fixed to a point of a fixed structure and it consists of a leg connected to a foot by means of a weld, wherein at the bottom the leg is surrounded by a flange, welded to the foot by means of a weld. There is a gap between the leg and the flange with a maximum width of up to 5% of the external leg diameter. Holes are provided in the foot into which fixing bolts are inserted that fix the anchorage to the substrate. The leg has a top base equipped with a hole for fixing anchoring elements, such as an anchoring rope, within the anchorage.

[0004] Application US2019234076 (A1) discloses a roof anchor for being detachably fixed to a seam of a roof panel. The anchor consists of two segments with flanges and is equipped with a hinge mechanism configured to open the roof anchor in order to move the first flange and the second flange away from each other by a distance greater than at least the top of the seam and to close the roof anchor.

[0005] Patent application KR20180111723 (A) discloses a solution for railings for fixing to a gable roof during maintenance works. The railing consists of a base plate fixed to the roof surface by means of an anchor bolt, a support rod fixed to the centre of the base plate in a detachable or non-detachable manner and a casing of a cover accommodating a tubular connecting part having a groove for inserting and fixing the support rod, having a case unit formed on the bottom side of the connecting part for covering the base plate together with the anchor bolt and having a flange connected to the edge of the box-shaped case. When one or more support rods are mounted, the railing is mounted by connecting and fixing by means of a horizontal rod.

[0006] Application DE102012105985 (A1) discloses a piece of equipment consisting of a base fixed to the substrate and an anchorage extending vertically from the base. An eye for mounting a safety line is provided in the top part of the anchorage. The connection between the anchorage and the plate is designed as a reference breaking connection . A metal rope connection comprising a stainless steel rope is arranged on the inside of the anchorage and it ensures a tight connection of the eye in the anchorage area of the device. The anchorage is made of plastic and closed with a cover, flap or plate.

[0007] Patent description NL1012984 discloses an anchoring device for fastening a safety line on a building, especially on a roof, which has a central anchorage equipped with fixing handles formed as eyes through which the safety line passes.

[0008] The essence of the invention consists in the anchorage being equipped with at least three supports, each of which is a rod with a variable cross-section, provided at both ends with end flat bars, wherein the top end flat bar is fixed to the top flat bar connected in a detachable or non-detachable manner to the common top plate, while the bottom end flat bar is fixed to the bottom flat bar connected in a non-detachable manner to a flat base partially fixed to the roof surface. Each support has at least one contraction, wherein one contraction is arranged at the mid-point of the support length, and the ratio of the total length of the contractions to the remaining length of the rod is between 1:5 and 2:6.

[0009] Preferably, the contraction of the support has a circle-shaped cross-section.

[0010] In a preferred embodiment, the contraction of the support has a polygon-shaped cross-section.

[0011] Preferably, the flat bars are connected to each other in a detachable manner, preferably be means of bolts.

[0012] Preferably, the flat bars are connected to each other in a non-detachable manner.

[0013] In a preferred embodiment, the top flat bars are welded to the top plate.

[0014] Preferably, the top flat bars are fixed to the top plate by means of taper bolts.

[0015] Preferably, the diameter of the contractions of the supports is between 7 and 12 mm.

[0016] Preferably, the ratio of the diameter of a wider section to the diameter or diagonal of a narrower section of the rod, i.e. the contraction is between 1.3:1 and 2.3:1.

[0017] Preferably, the supports have two contractions of approximately the same length.

[0018] Preferably, the second contraction is arranged directly underneath the top end flat bar.

[0019] In a preferred embodiment, each flat base has through mounting holes arranged on the half of the surface opposite to the half to which the flat bar is attached.

[0020] Preferably, the thickness of the flat bases is between 1.4 and 4 mm.

[0021] Preferably, the top plate has through holes in the central part that are adapted for mounting any type of line grip.

[0022] Preferably, the edges of the top plate are protected by a rubber or silicone cap.

[0023] The main advantage of the solution according to the invention is the construction of the anchorage which allows for its use for any type of roof, whether flat, gable, or hip, and made in any technology. If any stresses or forces start acting on the anchorage, the supports are angled at the narrower points, and the resulting forces are absorbed.

[0024] Another vital feature of the anchorages according to the invention is that they are not limited as to their height, unlike protections of this kind known from the art.

[0025] The object of the invention is shown in the embodiments in the drawing, where Fig. 1 is an axonometric view of the anchorage with three supports, Fig. 2 is a side view of the anchorage with three supports, Fig. 3 is a top view of the anchorage with three supports, Fig. 4 is an axonometric view of the anchorage with four supports, Fig. 5 is a side view of the anchorage with four supports, Fig. 6 is a top view of the anchorage with four supports.

Example I

[0026] The anchorage is provided with three supports 3, each of which is a rod with a variable cross-section, provided at both ends with end flat bars 7, 7'. The top end flat bars 7' are fixed by means of bolts 4 equipped with washers 5 and self-locking nuts 6 to the top flat bars 8', while the bottom end flat bars 7' are fixed by means of similar bolts 4 to the bottom flat bars 8'. The top flat bars 8 are attached in a non-detachable manner to the common plate 2. Each support 3 has one contraction 9' arranged approximately at the mid-point of its length. The bottom flat bars 8' are attached in a non-detachable manner to flat bases 1, wherein approximately half of each flat base 1 opposite the flat bar 8' has through mounting holes where bolts or anchors are arranged for attaching the anchorage to the slope of the roof.

[0027] The contractions 9 have cross-sections in the shape of a regular hexagon. The cross-sections of rods in wider sections have a diameter of 16 mm, while the diagonals of the contractions 9' have a length of 10 mm.

[0028] With the anchorage height of 70 cm, the total length of the rods is 63 cm, and the length of the rods alone is 56 cm, while the length of the contraction 9' is 10 cm.

Example II

[0029] The anchorage is provided with four supports 3, each of which is a rod with a variable cross-section, provided at both ends with end flat bars 7, 7'. The top end flat bars 7' are fixed by means of bolts 4 equipped with washers 5 and self-locking nuts 6 to the top flat bars 8', while the bottom end flat bars 7' are fixed by means of similar bolts with nuts to the bottom flat bars 8'. The top flat bars 8 are attached in a detachable manner to the common plate 2 by means of taper bolts 10. Each support 3 has two contractions 9' and 9', wherein the contraction 9' is arranged approximately at the mid-point of its length, while the contraction 9' is arranged directly underneath the end flat bar 8. The bottom flat bars 8' are attached in a non-detachable manner to flat bases 1, wherein approximately half of each flat base 1 opposite the flat bar 8' has through mounting holes where bolts or anchors are arranged for attaching the anchorage to the slope of the roof.

[0030] The contractions 9 have circle-shaped cross-sections. The cross-sections of rods in wider sections have a diameter of 14 mm, while the cross-sections of the contractions 9' have a diameter of 8 mm.

[0031] With the anchorage height of 70 cm, the total length of the rods is 63 cm, and the length of the rods alone is 56 cm, while the total length of the contractions 9 and 9' is 8 cm.

[0032] The edges of the top plate 2 are protected by a rubber or silicone cap 13.

[0033] The contractions 9', 9' and the flat bases 1 are provided for making the material more flexible, so that they become permanently deformed, which is the result of a substantial force being applied to the anchorage. Through deformation, the contractions 9', 9' and the bases 1 absorb some of the energy, so that only a small part thereof reaches the substrate to which the anchorage is fixed.

[0034] The values presented in the embodiments, rather than exhausting the entire scope of protection, are only an illustration thereof.

Claims

1. Fall protection anchorage, in particular for work at height, having with at least one base mounted to the slope of the roof, **characterised in that** it is equipped with at least three supports (3), each of which is a rod with a variable cross-section, provided at both ends with end flat bars (7, 7'), wherein the top end flat bar (7) is fixed to the top flat bar (8) connected in a detachable or non-detachable manner to the common top plate (2), whereas the end flat bar (7') is fixed to the bottom end flat bar (8') connected in a non-detachable manner to the flat base (1) partially fixed to the roof surface, wherein each support (3) has at least one contraction (9'), wherein one contraction (9') is arranged approximately at the mid-point of the support (3) length, and the ratio of the total length of the contractions to the remaining length of the rod is between 1:5 and 2:6.

2. The **anchorage** according to claim 1, **characterised in that** the contractions of the supports (3) have a circle-shaped cross-section.

3. The **anchorage** according to claim 1, **characterised in that** the contractions of the supports (3) have a polygon-shaped cross-section.

4. The **anchorage** according to claim 1, **characterised in that** the end flat bars (7, 7') are connected to the top (8) and bottom (8') flat bars in a detachable manner, preferably by means of bolts.

5. The **anchorage** according to claim 1, **characterised in that** the end flat bars (7, 7') are connected to the top (8) and bottom (8') flat bars in a non-detachable manner.

6. The **anchorage** according to claim 1, **characterised in that** the ratio of the diameter of a wider section to the diameter or diagonal of a narrower section of the rod, i.e. the contraction is between 1.3:1 and 2.3:1.

7. The **anchorage** according to claim 1, **characterised in that** the supports (3) have two contractions (9, 9') of approximately the same length.

8. The **anchorage** according to claim 1, **characterised in that** the second contraction (9) is arranged directly underneath the top end flat bar (7).

9. The **anchorage** according to claim 1, **characterised in that** the top flat bars (8) are welded to the top plate (2).

10. The **anchorage** according to claim 1, **characterised in that** the top flat bars (8) are fixed to the top plate (2) by means of taper bolts (10).

11. The **anchorage** according to claim 1, **characterised in that** the diameter of the contractions (9, 9') of the supports (3) is between 7 and 12 mm.

12. The **anchorage** according to claim 1, **characterised in that** each flat base (1) has through mounting holes (11) arranged on the half of the surface opposite to the half to which the bottom flat bar (8) is attached.

13. The **anchorage** according to claim 1, **characterised in that** the thickness of the flat bases (1) is between 1 and 4 mm.

14. The **anchorage** according to claim 1, **characterised in that** the top plate (2) has through holes (12) in the central part that are adapted for mounting any type of line grip.

14. The **anchorage** according to claim 1, **characterised in that** the edges of the top plate (2) are protected by a rubber or silicone cap (13).

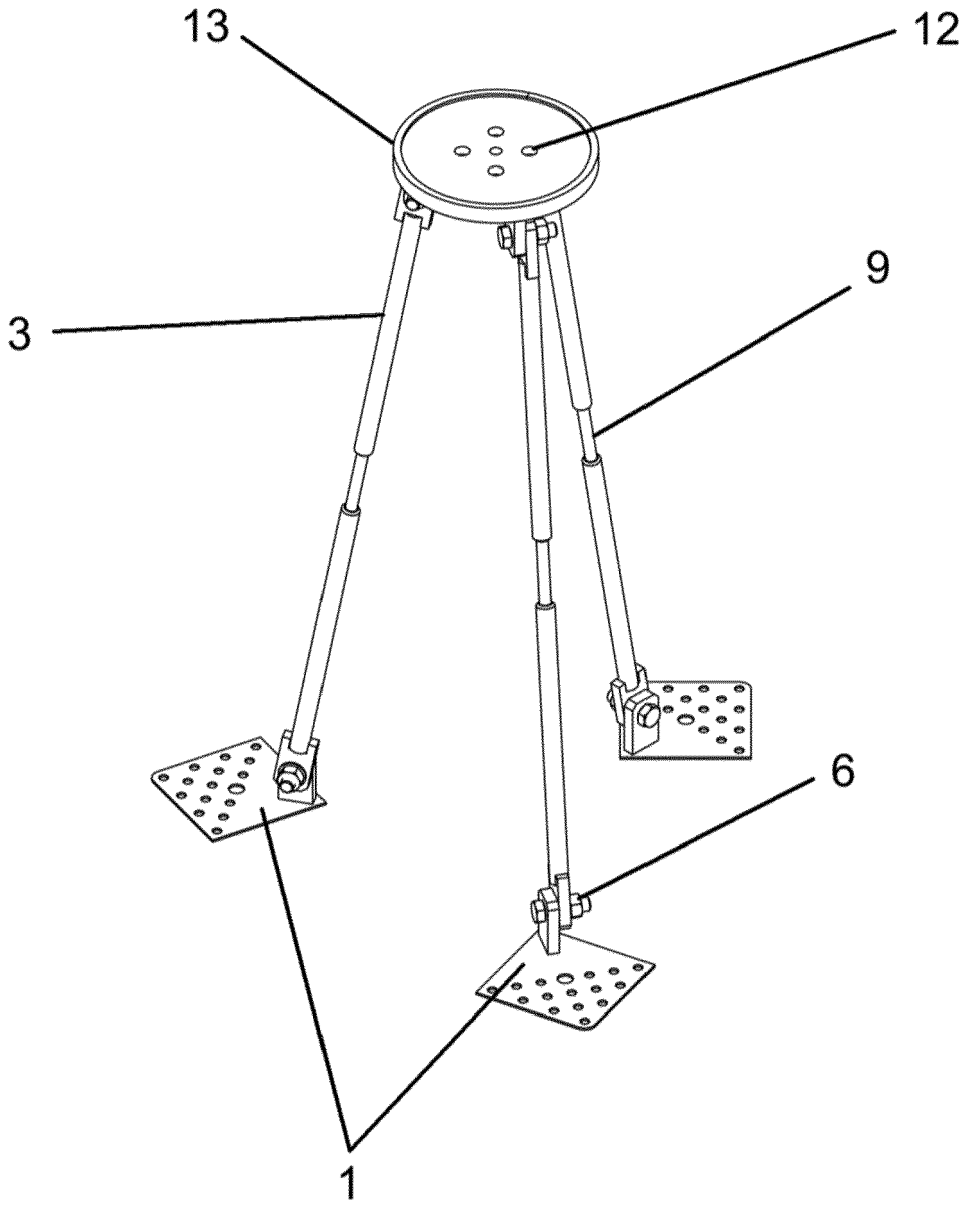

Fig. 1

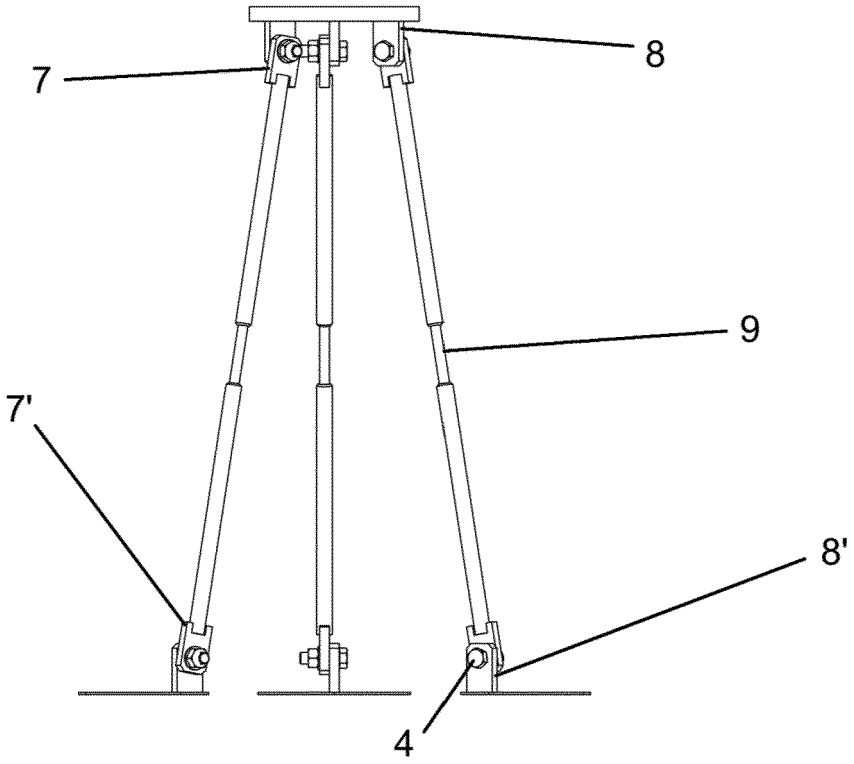

Fig. 2

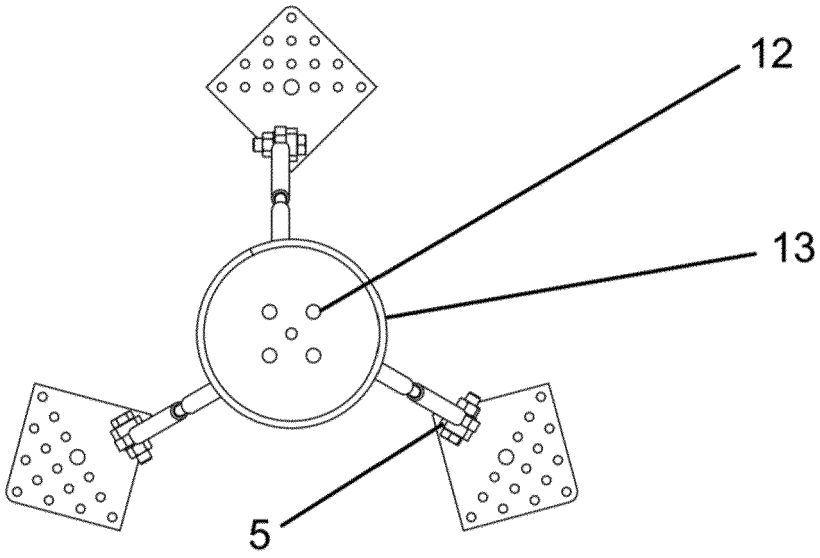

Fig. 3

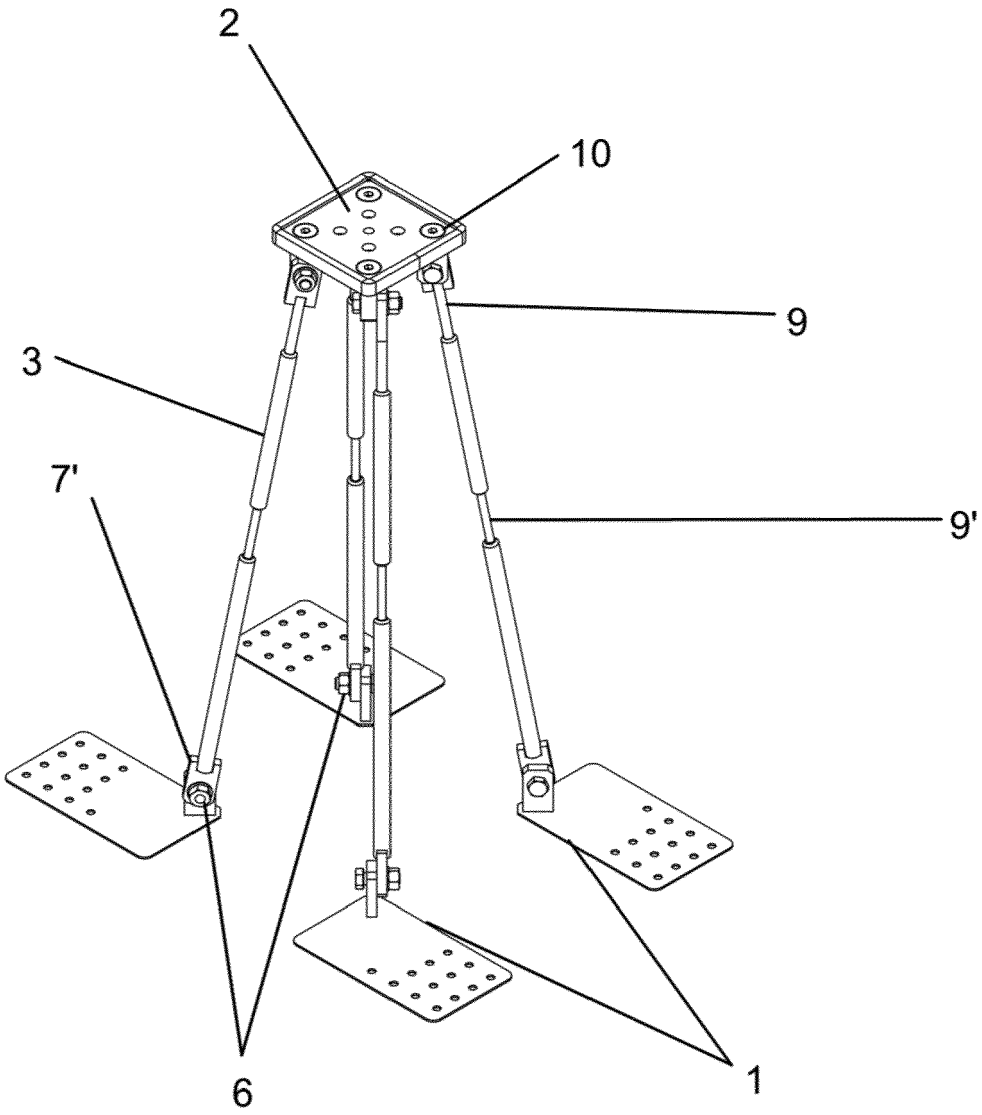

Fig. 4

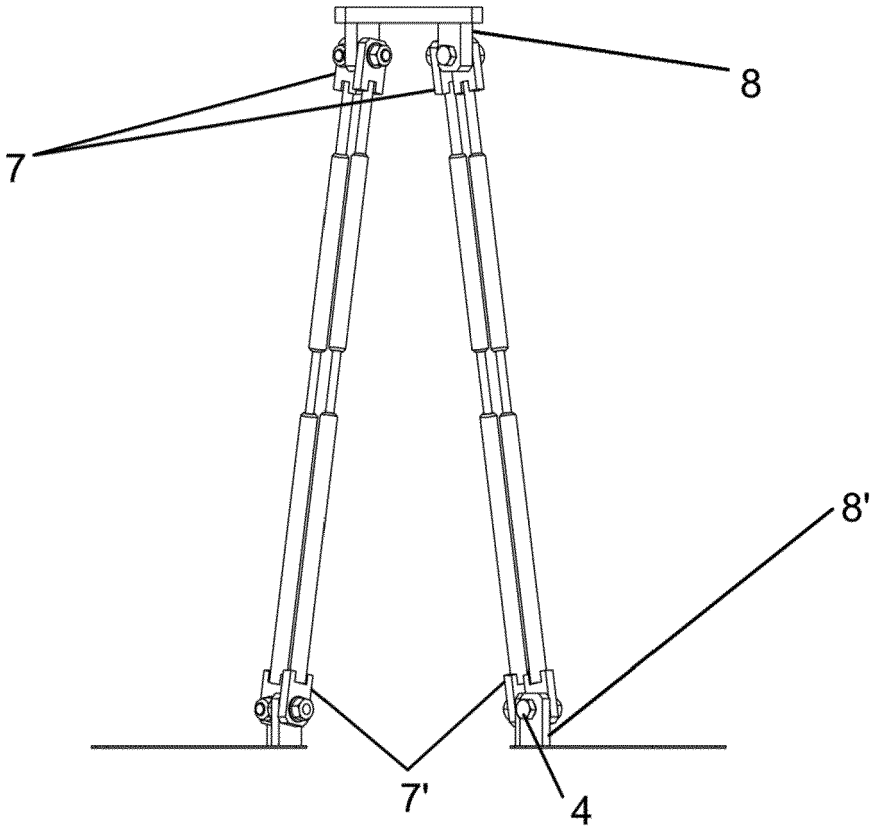

Fig. 5

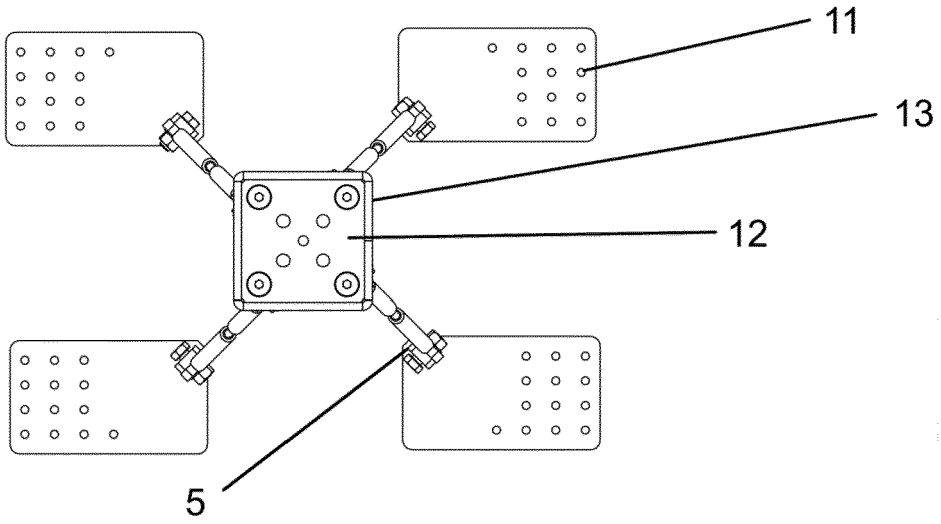

Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 20 20 9686

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	10 May 2021	Garmendia Irizar, A

CATEGORY OF CITED DOCUMENTS

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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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