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

(11) EP 2 378 032 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
19.10.2011 Bulletin 2011/42

(51) Int Cl.:
E04G 21/32 *(2006.01)* ***E04G 21/24*** *(2006.01)*

(21) Application number: **10160110.2**

(22) Date of filing: **16.04.2010**

(84) Designated Contracting States:
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 SE SI SK SM TR

(71) Applicant: **Combisafe International Aktiebolag**
831 34 Östersund (SE)

(72) Inventor: **Svedberg, Joakim**
832 53, Frösön (SE)

(74) Representative: **Loqvist, Gabriel Mathias**
Awapatent AB
P.O. Box 45086
104 30 Stockholm (SE)

(54) Soft net containment

(57) The invention related to a construction containment system (100) which comprises a flexible net (101) and a rigid elongated member (102) adapted to be arranged at an edge of the flexible net (101). The system further comprises a post (103) having an upper engagement (104) means at an upper end thereof for bringing the post (103) into engagement with an overhead element (10) as well as lower engagement means (105) at a lower end of the post (103) for bringing the post (103) into engagement with an underlying element (20). The post (103) is also provided with coupling means (106) provided for coupling of the rigid elongated member (102) to the post (103).

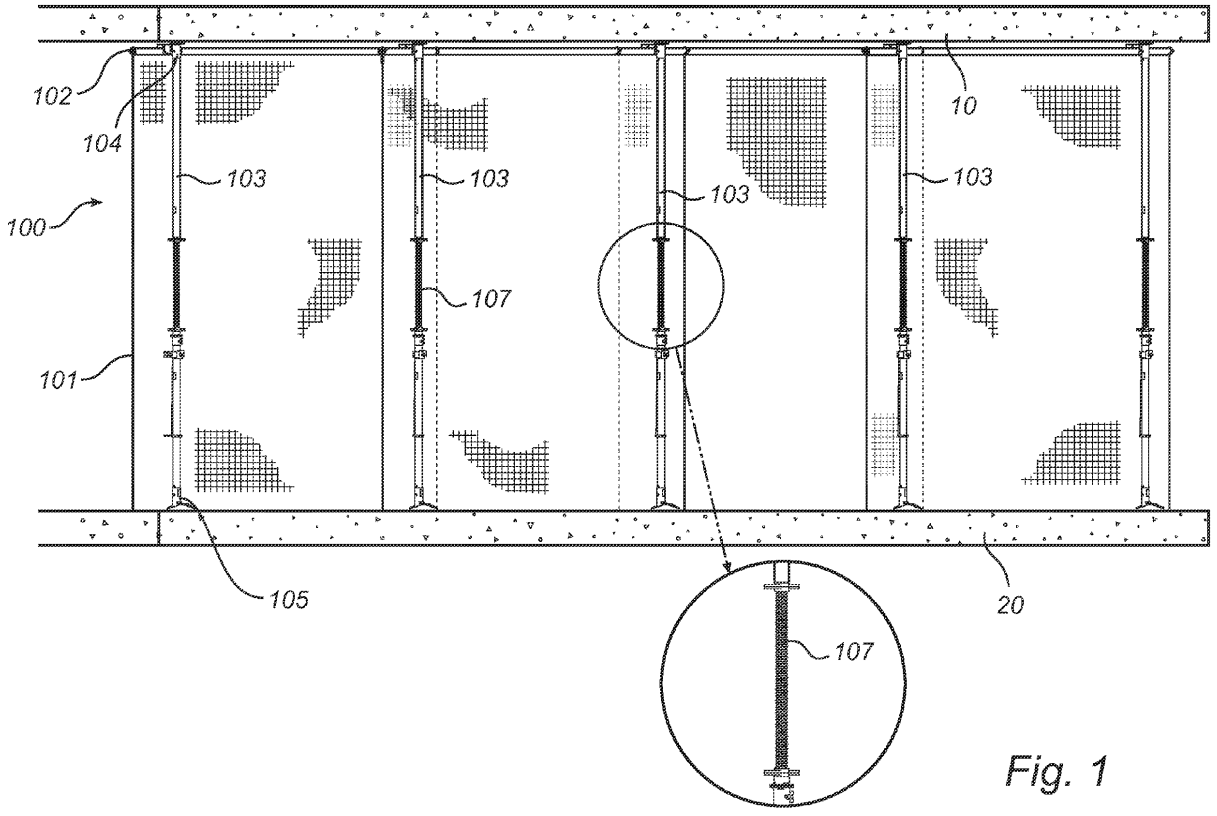

Fig. 1

EP 2 378 032 A1

Description

FIELD OF THE INVENTION

[0001] The present invention relates to safety barriers and more specifically to a construction containment system for preventing items or persons from falling from a building being constructed and method for mounting such a construction containment system.

BACKGROUND OF THE INVENTION

[0002] US-6904720 discloses a prior art construction containment system. That prior art system comprises a plurality of brackets and frame members which are attached to a building under construction. The frame members are adapted to slidably retain an edge portion of a sheet-like enclosure panel within a channel-formed portion of the frame member. The frame members can be mounted to run either horizontally or vertically along an outer face of the building. That prior art does, however, have a number of disadvantages. For example, due to the fact that the frame members have to be mounted to the outside of the building, the mounting is hazardous and requires skilled personnel and additional safety equipment. Further, since the frame members run the full height or full width, depending on the orientation of the frame members, of the opening of the building, the enclosure panels have to be inserted into the channel from one end of the frame member. This can be very troublesome. If, for example, the accessible end of the frame member is located outside an outer wall of the building the entire enclosure panel has to be hoisted alongside the building and subsequently be inserted into the channel-formed portion of the frame member.

SUMMARY OF THE INVENTION

[0003] It is an object of the present invention to provide an improved construction containment system that avoids the above-mentioned drawbacks. This object is achieved by a construction containment system according to the present invention as defined in claim 1 of the appended claims. This object is also achieved by a method for mounting a construction containment system as defined in claim 15 of the appended claims.

[0004] Thus, in accordance with an aspect of the present invention there is provided a construction containment system comprising a flexible net, a rigid elongated member adapted to be arranged at an edge of the flexible net and a post comprising upper engagement means at an upper end thereof for bringing the post into engagement with an overhead element and lower engagement means at a lower end of the post for bringing the post into engagement with an underlying element. The construction containment system further comprises coupling means provided at the post for coupling of the rigid elongated member to the post. Due to the fact that the complete construction containment system can be erected from within the building, the mounting operation is less hazardous for the personnel and the amount of safety equipment can be reduced.

[0005] In accordance with an embodiment of the construction containment system of the invention, the post is telescopically adjustable in length. This results in a system with a high degree of flexibility.

[0006] In accordance with an embodiment of the construction containment system of the invention, the post comprises a threaded jacking portion. By using a threaded jacking portion for clamping the post to the building, very high forces can be achieved leading to a secure engagement of the construction containment system to the building.

[0007] In accordance with an embodiment of the construction containment system of the invention, a load indicator is provided for indicating an amount of axial load exerted on the post, wherein said load indicator comprises a cup spring. By using a load indicator it can be assured that a sufficient axial force is provided upon the post for achieving a secure engagement of the construction containment system to the building.

[0008] In accordance with an embodiment of the construction containment system of the invention, the post comprises a clinometer. A clinometer is a very convenient way of assuring that the post is mounted vertical.

[0009] In accordance with an embodiment of the construction containment system of the invention, the coupling means comprises a generally c-shaped member having an opening directed towards the lower end of the post and wherein an internal diameter of the c-shaped member is larger than the diameter of the rigid elongated member and wherein a width of the opening of the c-shaped member is smaller than a diameter of the rigid elongated member. This renders it possible to retain the rigid elongated member safely within the c-shaped member while at the same time allowing the flexible net to pass unhindered through the mouth of the c-shaped member.

[0010] In accordance with an embodiment of the construction containment system of the invention, at least one of the engagement means comprises a tripod. The tripod ensures a reliable engagement with the overhead element.

[0011] In accordance with an embodiment of the construction containment system of the invention, end plugs are provided at opposite ends of the rigid elongated member, and wherein said end plugs are cone-shaped and wherein the diameter of the base of the cone is larger than a diameter of the rigid elongated member. The cone-shape of the end plugs allows for an easy insertion of the rigid elongated members into the coupling means whereas the larger diameter of the cone compared to the rigid elongated member secures the rigid elongated member to the coupling means.

[0012] In accordance with an embodiment of the construction containment system of the invention, the rigid

elongated member comprises a profile having a coupling groove extending in the longitudinal direction of the profile and wherein said coupling groove comprises a bottom and a mouth and wherein a cross-section of the coupling groove enlarges from the mouth towards the bottom.

[0013] In accordance with an embodiment of the construction containment system of the invention, the coupling means comprises a retaining part having a cross section that is complimentary to the cross section of the coupling groove. This guarantees a secure coupling of the rigid elongated member to the coupling means.

[0014] In accordance with an embodiment of the construction containment system of the invention, the rigid elongated member comprises a profile having a net retaining groove extending in the longitudinal direction of the profile and wherein said net retaining groove comprises a bottom and a mouth and wherein a cross-section of the net retaining groove enlarges from the mouth towards the bottom.

[0015] In accordance with an embodiment of the construction containment system of the invention, the flexible net comprises an edge element along an edge to which the rigid elongated member is to be arranged, wherein said edge element has a cross section which is complimentary to the cross section of said net retaining groove such that said edge element can be retained within said net retaining groove.

[0016] In accordance with an embodiment of the construction containment system of the invention, the coupling means provided at the post comprises two separate couplers provided adjacent each other in a direction substantially perpendicular to the surface of the flexible net in a mounted state. By arranging two separate couplers in this manner, it is possible to obtain an overlap of adjacent flexible nets. This is sometimes necessary in order to avoid that gaps develop between the flexible nets.

[0017] In accordance with an embodiment of the construction containment system of the invention, the coupling means are attached to the post by means of a clamping device. By using clamping means, the coupling means can be adjusted in height along the post which sometimes is necessary, for example when the exterior of the building to which the construction containment system is to be mounted does not permit the coupling means to be positioned at the top of the post.

[0018] In accordance with another aspect of the present invention there is provided a method for mounting a construction containment system, the method comprising the steps of arranging an elongated rigid member at an edge of a flexible net, erecting a first and a second post by clamping the posts between an overhead element and an underlying element, wherein the distance between said first and second post is less than the length of the rigid elongated members. Thereafter the rigid elongated member and the flexible net are hoisted towards the posts and the rigid elongated member is slided in a first direction into engagement with a first coupling means provided at the first post and then slided in a second, opposite, direction, into engagement with a second coupling means provided at the second post, while the rigid elongated member remain in engagement with the first coupling means. Due to the fact that the complete construction containment system can be erected from within the building, the mounting operation is less hazardous for the personnel and the amount of safety equipment can reduced.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The invention will now be described in more detail and with reference to the appended drawings in which:

Fig. 1 is a schematic front view of a first embodiment of a construction containment system according to of the invention.

Fig 2 is a schematic side view of a first embodiment of a construction containment system according to the invention.

Fig 2a is a schematic side view of a detail of a first embodiment of a construction containment system according to the invention.

Fig. 3 is a schematic front view of a second embodiment of a construction containment system according to the invention.

Fig 4 is a schematic side view of a second embodiment of a construction containment system according to the invention.

Fig. 5 is a schematic front view of a third embodiment of a construction containment system according to the invention.

Fig 6 is a schematic side view of a third embodiment of a construction containment system according to the invention.

Fig. 7 is a schematic perspective view of a first embodiment of a coupling means according to the invention.

Fig. 8 is a schematic perspective view of a second embodiment of a coupling means according to the invention.

Fig. 9 is a schematic perspective view of a of a load indicator according to the invention.

Fig. 10 is a schematic and partly exploded side view of a load indicator according to the invention.

Fig.11 is a schematic side view of a third embodiment of a coupling means according to the invention and a second embodiment of a rigid elongated member according to the invention.

Fig. 12 is schematic perspective view of a second embodiment of a coupling means according to the invention.

Fig. 13 is a schematic perspective view of a threaded jacking portion according to the invention.

Figs. 14 and 14a are schematic illustrations of a mounting tool for a flexible net according to the invention.

Fig. 15 is a schematic perspective view of an end plug according to the invention.

Figs. 16 and 17 are schematic perspective views of an end plug according to the invention mounted to a rigid elongated member.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0020] In a first embodiment of a construction containment system according to the invention, as shown in figures 1, 2 and 2a, a construction containment system 100 comprises a plurality of posts 103 and a number of flexible nets 101. Each flexible net 101 is provided with a rigid elongated member 102 comprising tubes of aluminium or similar at an upper end thereof. The rigid elongated member 102 provides the necessary rigidity to avoid that the flexible net 101 hang down between the posts 103 thereby causing gaps in the containment. The construction containment system 100 further comprises coupling means 106 provided at an upper region of the posts for coupling the rigid elongated members 102 and the flexible nets 101 to the posts 103. The posts 103 are clamped between upper and lower concrete slabs 10, 20 of a building by means of a threaded jacking portion 107 provided at each of the posts 103. The threaded jacking portion 107 provides a wide span of possible jacking distance and it is possible to obtain very high jacking forces by using a suitable pitch of thread. High jacking forces are necessary in order for the posts to withstand the forces acting thereupon, e.g. wind load on the flexible nets 101 which have to be absorbed by the posts. Jacking forces about 700 kg is sometimes necessary and imply no problem for the threaded jacking portion 107 according to the invention. A load indicator 900 is provided at the post below the threaded jacking portion 107. It should be noted though, that the load indicator can be provided at other locations along the post as well, e.g. above the threaded jacking portion 107. The load indicator 900 can provide optical feedback to a user that the post 103 has been clamped to the construction with the required force, to avoid any uncertainty as to whether a post 103 has been clamped adequately or not. Each post 103 is further provided at its upper end with an upper engagement means 104 comprising a tripod 705 with sharpened tips to assure a reliable engagement with the concrete slab 10. The upper engagement means 104 can be connected to the post 103 by means of a spring loaded pin 110. At its lower end, each post 103 is provided with lower engagement means 105 comprising an anchoring element which is bolted to the concrete slab 20. Similar to the upper engagement means 104, the lower engagement means 105 can be connected to the post 103 by means of a spring loaded pin, not explicitly shown in the figures. Other engagement solutions are also possible for both upper and lower engagements means 104, 105, for example anchoring elements may be embedded in the concrete slabs 10, 20. A clinometer 109 is provided at the post at a position where a person taking part in the mounting of the post can observe it. The clinometer 109 would typically be of the air-bubble-type and could be permanently attached to the post 103 or be removable such that it can be used for mounting of other posts as well. Coupling means 106 for coupling of the rigid elongated member 102 to the posts 103 are provided at the upper engagement means 104. The coupling means 106 comprises two generally c-shaped members 701, 702 which are mounted parallel and adjacent each other in a direction substantially perpendicular to the surface of the flexible net 101. This allows for two adjacent flexible nets 101 to be mounted with an overlap, thereby minimizing the risk of any gaps occurring between the flexible nets 101. The inner diameter of the c-shaped members 701, 702 is somewhat larger than the diameter of the rigid elongated member 102 whereas the width of the downwardly directed opening of the c-shaped members 701, 702 is smaller than the diameter of the rigid elongated member 102 such that the rigid elongated member 102 can be safely retained within the c-shaped members 701, 702 while the downwardly directed opening of the c-shaped members 701, 702 allow for the flexible net 101 to pass through. The coupling means 106 can be welded, bolted, riveted or clamped to the engagement means 104 or the post 103. Other methods of fastening evident to the person skilled in the art are also possible. Straps, not shown in the figures, can be used to tie the flexible net 101 to the posts 103 once the rigid elongated member 102 is positioned in the corresponding c-shaped members 701, 702 of two adjacent posts 103.

[0021] Commonly, the construction containment system according to the first embodiment of the invention is erected as follows: An elongated rigid member 102 is arranged at an edge of a flexible net 101, typically the elongated rigid member 102 will be arranged within a channel formed at an edge of the flexible net 101. Thereafter a first and a second post 103 are erected by clamping the posts 103 between an overhead element 10 and an underlying element 20. The distance between the posts 103 is less than the length of the rigid elongated member 102. The clamping of the posts is done by means of the threaded jacking portions 107 of each post 103. A worker will continue to thread until the load indicator 900 indicates that a sufficient axial load is applied to the post 103. When the two posts 103 are sufficiently clamped to the building the rigid elongated member 102 together with the flexible net 101 is hoisted towards the upper region of the posts 103 and slided in a first direction into engagement with a c-shaped member 701, 702 provided at the first post 103. Then, the rigid elongated member 102 and the flexible net 101 is slided in a second direction, opposite to said first direction, into engagement with a c-shaped member 701, 702 provided at the second post 103, while the rigid elongated member 102 remain in engagement with the c-shaped member 701, 702 of the first post. Thereafter, the flexible net 101 is fixed to the posts 103 by means of straps or similar.

[0022] In a second embodiment of a construction con-

tainment system 300 according to the invention, as shown in figures 3 and 4, a plurality of mesh panels 330 are provided adjacent each other at a bottom part of the posts 303. The mesh panels 330 comprise horizontal wires, vertical wires, and a foot plate 331, which is arranged at a bottom portion of the mesh panel 330. The use of mesh panels 330 can be necessary in order to prevent workers, tools and material from falling down towards the ground at an earlier stage of the building procedure, before a complete construction containment system becomes necessary. Also, a mesh panel 330 provides a more sturdy protection for a worker. The mesh panels 330 are hung up on mesh panel holders 332, 333 provided on the posts 303. These mesh panel holders 332, 333 are adjustable in height such that a mesh panel 330 can be raised if, for example, access to the outer edge of the construction is required. Commonly, the construction containment system according to the second embodiment of the invention is erected as follows: An elongated rigid member 302 is arranged at an edge of a flexible net 301, typically the elongated rigid member 302 will be arranged within a channel formed at an edge of the flexible net 301. Thereafter a first and a second post 303 are erected by clamping the posts 303 between an overhead element 10 and an underlying element 20. Upper engagement means 304 comprises a tripod 705 with sharpened tips to assure a reliable engagement with the concrete slab 10. Lower engagement means 305 comprises a anchoring element which is bolted to the concrete slab and which anchoring element comprises a protruding portion onto which the post 303 is fitted. Instead of a bolted anchoring element, an anchoring element embedded in the concrete slab could be used. The distance between the posts 303 is less than the length of the rigid elongated member 302. The clamping of the posts is done by means of the threaded jacking portions 307 of each post 303. A worker will continue to thread until the load indicator 900 indicates that a sufficient axial load is applied to the post 303. When the two posts 303 are sufficiently clamped to the building the mesh panels 330 are mounted to the posts by means of the adjustable mesh panel holders 332, 333. Then the rigid elongated member 302 together with the flexible net 301 is hoisted towards the upper region of the posts 303 and slided in a first direction into engagement with a c-shaped member 701, 702 provided at the first post 303. Then, the rigid elongated member 302 and the flexible net 301 is slided in a second direction, opposite to said first direction, into engagement with a c-shaped member 701, 702 provided at the second post 303, while the rigid elongated member 302 remain in engagement with the c-shaped member 701, 702 of the first post. Thereafter, the flexible net 301 is fixed to the posts 303 and possibly also to the mesh panels 330 by means of straps or similar.

[0023] In a third embodiment of a construction containment system 500 according to the invention, as shown in figures 5 and 6, a plurality of mesh panels 550 are provided. This third embodiment differs from the second embodiment described above in that the post 503 is integrated with one of the vertical sides of the mesh panel 550 whereas the other vertical side of the mesh panel is free. A mesh panel of this type has the advantage of a small number of constituent parts and a reduced required number of steps involved when mounting the system. This increases the safety for the workers and reduces the working time. Since the post 503 is integrated with one of the vertical sides of the mesh panel 550 a bottom row of mesh panels 550 is automatically created when the posts 503 are erected. Since each post 503 is integrated with one mesh panel 550 a separate post 503' has to be used to finish the construction containment system 500 of the third embodiment according to the invention. Commonly, the construction containment system according to the third embodiment of the invention is erected as follows: An elongated rigid member 502 is arranged at an edge of a flexible net 501, typically the elongated rigid member 502 will be arranged within a channel formed at an edge of the flexible net 501. Thereafter a first post 503 together with the integrated mesh panel 550 and a second separate post 503' are erected by clamping the posts 503, 503' between an overhead element 10 and an underlying element 20. Upper engagement means 504 of the posts 503, 503' comprises a tripod 705 with sharpened tips to assure a reliable engagement with the concrete slab 10. Lower engagement means 505 of the posts 503, comprises an anchoring element which is bolted to the concrete slab and which anchoring element comprises a protruding portion onto which the post 503 is fitted. The construction of the second post 503' is similar to those described in the previous embodiments of the construction containment system according to the invention. The distance between the posts 503, 503' is less than the length of the rigid elongated member 502. The clamping of the posts 503, 503' is done by means of the threaded jacking portions 507 of each post 503, 503'. A worker will continue to thread until the load indicator 900 indicates that a sufficient axial load is applied to the post 503, 503'. When the posts 503, 503' and the mesh panels 550 are clamped between the overhead element 10 and the underlying element 20 the free vertical side of the mesh panel 550 is fastened to the separate post 503' by means of a strap or similar, not shown in the figures. Then the rigid elongated member 502 together with the flexible net 501 is hoisted towards the upper region of the posts 503, 503' and slided in a first direction into engagement with a c-shaped member 701, 702 provided at the first post 503. Then, the rigid elongated member 502 and the flexible net 501 is slided in a second direction, opposite to said first direction, into engagement with a c-shaped member 701, 702 provided at the second post 503', while the rigid elongated member 502 remain in engagement with the c-shaped member 701, 702 of the first post 503. Thereafter, the flexible net 501 is fixed to the posts 503, 503' and possibly also to the mesh panels 550 by means of straps or similar. Unlike the mesh panel 330 described above, the mesh panel

550 according to this third embodiment cannot be adjusted in height. However, by unfastening the straps fastening a free vertical side of a mesh panel 550 the mesh panel 550 can swivel around the vertical axis of the post 503. The protruding portion of the anchoring element and the threaded jacking 507 portion of the post 503 will act as hinges in this respect. This swiveling movement of the mesh panel 550 will only have a very minor effect on the jacking force exerted on the post and besides, the load indicator 900 will indicate if the force falls below a required threshold value.

[0024] In a first embodiment of a coupling means according to the invention, as shown in figure 7, the coupling means comprises two c-shaped members 701, 702. The c-shaped members 701, 702 each comprises an opening 703, 704 which, when mounted to a post 103, is directed downwards towards the lower end of the post 103. The c-shaped member 701, 702 is dimensioned such that its internal diameter is larger than the diameter of the rigid elongated member 102 and the width of the opening 703, 704 of the c-shaped member 701, 702 is smaller than a diameter of the rigid elongated member 102. By this, the rigid elongated member 102 can be inserted laterally into the c-shaped member and the rigid elongated member 102 is prevented from any vertical movement, e.g. it cannot fall down. Yet, the flexible net 101 can pass unhindered through the opening 703, 704. The c-shaped members are attached to the tripod 705. This attachment can be done in several ways, e.g. welding, bolting or riveting. The tripod 705, comprising three sharpened tips for engagement with e.g. a concrete slab, is attached to a post by means of tube 706 having an opening 707 in it. The opening 707 can accommodate a locking device, such as a bolt or a spring loaded pin, to secure the tripod 705 and the coupling means to a post.

[0025] In a second embodiment of a coupling means according to the invention, as shown in figure 8, the coupling means comprises two c-shaped members 801, 802 attached to a clamping device 803. This solution has the advantage that the position of the coupling means can be adjusted. This is convenient for example when the exterior of the building to which the construction containment system is to be mounted does not permit the coupling means to be positioned at the top of the post 103, as is the case with the first embodiment of the coupling means according to the invention as shown in figure 7.

[0026] A load indicator 900 according to the invention, as shown in figures 9 and 10, comprises an upper flange 901, a lower flange 902, a cup spring 903 sandwiched between the upper flange 901 and the lower flange 902 and a connecting sleeve 904 connecting these three parts together. Cup springs can be manufactured with a high accuracy regarding the load at which the cup spring sets and flattens out. The construction of the load indicator 900 admits a person to take a look at the load indicator 900, preferably from the side, and if there is no gap between the upper flange 901 and the lower flange 902 he immediately realizes that the axial force applied on the load indicator, and therefore also on the post, is sufficient. If, on the other hand, there still is a visible gap, additional axial force has to be imposed. A locking bolt 905 is provided to lock the load indicator 900 to a post, this applies especially during erecting of the post to avoid that the load indicator 900 is inadvertently lost and may fall down from a building.

[0027] In a third embodiment of a coupling means according to the invention and a second embodiment of a rigid elongated member according to the invention, as shown in figures 11 and 12, the coupling means 106 comprises a generally L-shaped member 1130 and the rigid elongated member 1102 comprises a profile 1121. The L-shaped member 1130 is preferably, but not necessarily, made from metal such as aluminium or steel. The profile 1121 is preferably, but not necessarily, extruded from aluminium or plastics. Similar to the coupling means shown in figures 7 and 8, the L-shaped member 1130 of the second embodiment can be fixed to an upper part of the post, cf. figure 7, or it can be attached to an adjustable part, cf. figure 8. Even though only one L-shaped member 1130 is disclosed in figures 11 and 12, it is quite possible to mount these adjacent each other in a direction substantially perpendicular to the surface of the flexible net 1101 in order to be able to mount flexible nets 1101 with overlap, similar to the c-shaped members of the first embodiment. The L-shaped member 1130 comprises a retaining part 1133 having a cross-section that is complimentary to a cross section of a coupling groove 1122 in the profile 1121. The coupling groove 1122 is open at both short sides of the profile and extends the full length of the profile 1121. The profile can therefore be slid into engagement with the retaining part 1133 of the L-shaped member 1130. The coupling groove 1122 has a width at its bottom 1123 which is somewhat larger than the width of the retaining part 1133 at its widest point whereas a mouth 1124 of the coupling groove 1122 has a width which is less than the width of the retaining part 1133 at its widest point so that the rigid elongated member 1102 can be moved in its axial direction sliding on the retaining part 1133 while being prevented from falling down. The retaining part 1133 has tapered ends to facilitate the engagement with the rigid elongated member 1102. The retaining part 1133 is followed by a leg 1132 which is adapted to pass through the mouth 1124 of the coupling groove 1122, said leg 1132 in turn is followed by a base plate 1131 provided with two bolt holes for connecting the L-shaped member to a post. In addition to the coupling groove 1122, the profile 1121 comprises a net retaining groove 1141. The net retaining groove 1141 extends the full length of the profile and comprises a base 1142, and a mouth 1143 and wherein a cross-section of the net retaining groove 1141 enlarges from the mouth 1143 towards the bottom 1142 such that an edge element 1181 of a flexible net 1101 can be retained within the net retaining groove 1141.

[0028] A threaded jacking portion 1300 of a post 103 according to the invention, as shown in figure 13, com-

prises a threaded rod 1301, a first threaded handle 1302, a second threaded handle 1303 and a jacking tool 1304 with a safety catch strap 1305 to avoid that a user loses the jacking tool. By turning the first threaded handle 1302 and/or the second threaded handle 1303 in suitable directions a user can adjust the length of a post and thereby increase or decrease the axial force imposed on the post 103. This can be done by hand during a first part of the mounting of a post but at some point the forces will be too high to do so. Jacking tool 1304 can be used to apply the necessary force to clamp the post 103 to a building. Compared to using a hammer, which sometimes is done, the jacking tool 1304 can apply the required force in a more controlled manner. To avoid that the threaded rod 1301 is moved too far in one axial direction, thereby jeopardizing the stability of the post 103, a suitable length of both ends of the threaded rod 1301 can be painted in a glaring color so that a user realizes that the threaded rod 1301 should be displaced in the other direction.

[0029] A flexible net 101 and a rigid elongated member 102 according to the invention can be hoisted with a mounting tool 1400 as shown in figure 14. A mounting tool 1400 comprises a telescopic shaft 1401 having a safety catch strap 1402 and a handle 1403 at one end thereof and a hook device 1404 at the other end. To hoist the flexible net 101 and the rigid elongated member 102 two persons equipped with one mounting tool each thread the hook device 1404 over the rigid elongated member 102 and then twist the mounting tool such that the hook device 1404 firmly grasps the rigid elongated member 102. When the rigid elongated member 102 and the flexible net 101 are positioned within the coupling means, not shown in figure 14, the mounting tool 1400 is twisted in the opposite direction to disengage it from the rigid elongated member 102.

[0030] An end plug 1500 according to the invention, as shown in figures 15-17, comprises a cone-shaped member 1501 and two locking branches 1502, 1503. The base 1506 of the cone-shaped member 1501 has a diameter which is larger than a diameter of a rigid elongated member 102 to which it is attached. In order to be insertable into a c-shaped member of the coupling means, not shown in figures 15-17, the diameter of the base 1506 of the cone-shaped member 1501 must, however, be less than the width of the c-shaped member. The cone shape makes it simple to hit the c-shaped member whereas the difference in diameter between the base 1506 of cone-shaped member 1501 and the rigid elongated member 102 ensures that once the end plug 1500 mounted to the rigid elongated member 102 has been moved to pass through the c-shaped member the rigid elongated member 102 will fall down and rest against the c-shaped member and the base 1506 will act as a hard stop against the c-shaped member and prevent axial movement in a direction back through the c-shaped member. The two locking branches 1502, 1503 each comprise a locking pin 1504 which will snap into locking position in a corresponding opening in the rigid elongated member 102. A groove 1505 is provided in the base 1506 in order to prevent the flexible net 101 from creeping on the rigid elongated member thereby causing gaps in the construction containment system. An outer mesh of the flexible net 101 is positioned in the groove 1505 so that the flexible net 101 cannot move axially along the rigid elongated member. The end plug is preferably, but not necessarily, made from plastics.

Claims

1. A construction containment system (100, 300, 500) said construction containment system (100, 300, 500) comprising:

   a flexible net (101, 1101);
   a rigid elongated member (102, 1102) adapted to be arranged at an edge of the flexible net (101, 1101);
   a post (103, 303, 503, 503') comprising upper engagement (104) means at an upper end thereof for bringing the post (103, 303, 503, 503') into engagement with an overhead element (10) and lower engagement means (105) at a lower end of the post (103, 303, 503, 503') for bringing the post (103, 303, 503, 503') into engagement with an underlying element (20);
   coupling means (106) provided at the post (103, 303, 503, 503') for coupling of the rigid elongated member (102) to the post (103, 303, 503, 503').

2. A construction containment system (100, 300, 500) according to claim 1, wherein the post (103, 303, 503, 503') is telescopically adjustable in length.

3. A construction containment system (100, 300, 500) according to claim 1 or 2, wherein the post (103, 303, 503, 503') comprises a threaded jacking portion (107, 1300).

4. A construction containment (100, 300, 500) system according to any of the preceding claims, further comprising a load indicator (900) for indicating an amount of axial load exerted on the post (103, 303, 503, 503'), wherein said load indicator (900) comprises a cup spring (903).

5. A construction containment system (100, 300, 500) according to any of the preceding claims, wherein the post (103, 303, 503, 503') comprises a clinometer (109).

6. A construction containment system (100, 300, 500) according to any of the preceding claims, wherein the coupling means (106) comprises a generally c-shaped member (701, 702, 801, 802) having an opening (703, 704, 803, 804) directed towards the

lower end of the post (103, 303, 503, 503') and wherein an internal diameter of the c-shaped member (701, 702, 801, 802) is larger than the diameter of the rigid elongated member (102) and wherein a width of the opening (703, 704, 803, 804) of the c-shaped member (701, 702, 801, 802) is smaller than a diameter of the rigid elongated member (102).

7. A construction containment system (100, 300, 500) according to any of the preceding claims, wherein at least one of the engagement means (104, 105) comprises a tripod (705).

8. A construction containment system (100, 300, 500) according to any of the preceding claims, wherein end plugs (150) are provided at opposite ends of the rigid elongated member (102), and wherein said end plugs (150) are cone-shaped and wherein the diameter of the base of the cone is larger than a diameter of the rigid elongated member (102).

9. A construction containment system (100, 300, 500) according to any of the preceding claims, wherein the rigid elongated member (1102) comprises an profile (1121) having a coupling groove (1122) extending in the longitudinal direction of the profile (1121) and wherein said coupling groove (1122) comprises a bottom (1123) and a mouth (1124) and wherein a cross-section of the coupling groove (1122) enlarges from the mouth (1124) towards the bottom (1123).

10. A construction containment system (100, 300, 500) according to claim 9 or 10, wherein the coupling means (106) comprises a retaining part (1133) having a cross section that is complimentary to the cross section of the coupling groove (1122).

11. A construction containment system (100, 300, 500) according to any of the preceding claims, wherein the rigid elongated member (1102) comprises a profile (1121) having a net retaining groove (1141) extending in the longitudinal direction of the profile (1121) and wherein said net retaining groove (1141) comprises a bottom (1142) and a mouth (1143) and wherein a cross-section of the net retaining groove (1141) enlarges from the mouth (1143) towards the bottom (1142).

12. A construction containment system (100, 300, 500) according to claim 12, wherein the flexible net (1101) comprises an edge element (1181) along an edge thereof to which the rigid elongated member (1102) is to be arranged, wherein said edge element (1181) has a cross section which is complimentary to the cross section of said net retaining groove (1141).

13. A construction containment system (100, 300, 500) according to any of the preceding claims, wherein the coupling means (106) comprises two separate members (701, 702, 801, 802, 1130) provided adjacent each other in a direction substantially perpendicular to the surface of the flexible net (101, 1101) in a mounted state.

14. A construction containment system (100, 300, 500) according to any of the preceding claims, wherein the coupling means (106) are attached to the post (103, 303, 503, 503') by means of a clamping device (803).

15. A method for mounting a construction containment system (100, 300, 500) according to any of the preceding claims to a construction, said method comprising the steps of:

- arranging an elongated rigid member (102, 1102) at an edge of a flexible net (101, 1101);
- erecting a first and a second post (103, 303, 503, 503') by clamping the posts (103, 303, 503, 503') between an overhead element (10) and an underlying element (20), wherein the distance between said first and second post (103, 303, 503, 503') is less than the length of the rigid elongated member (102, 1102);
- hoisting the rigid elongated member (102, 1102) and the flexible net (101, 1101) towards the posts (103, 303, 503, 503');
- sliding the rigid elongated member (102, 1102) in a first direction into engagement with a first coupling means (106) provided at the first post (103, 303, 503, 503');
- sliding the rigid elongated member (102, 1102) in a second direction, opposite to said first direction, into engagement with a second coupling means (106) provided at the second post (103, 303, 503, 503'), while the rigid elongated member (102, 1102) remain in engagement with the first coupling means (106).

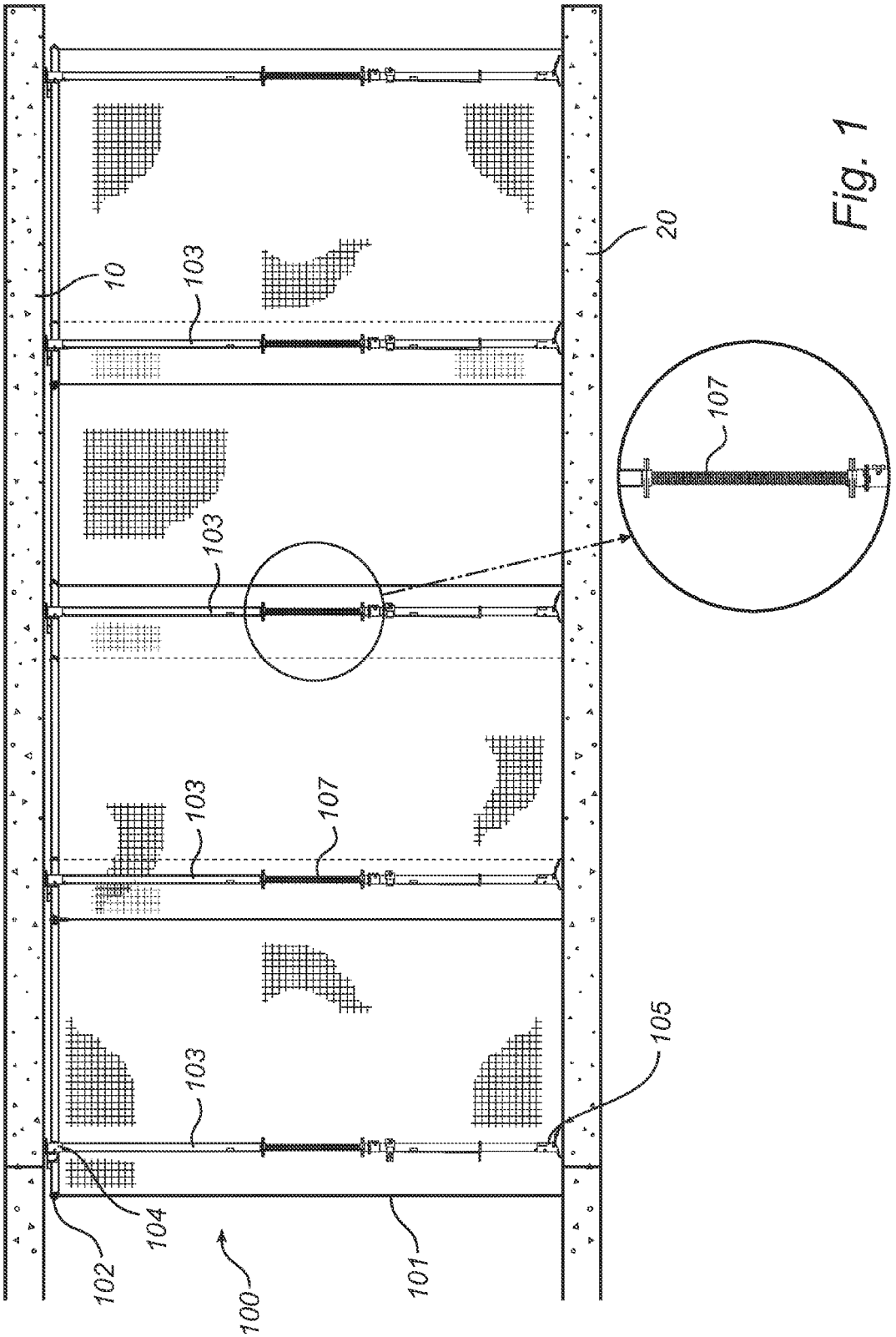

Fig. 1

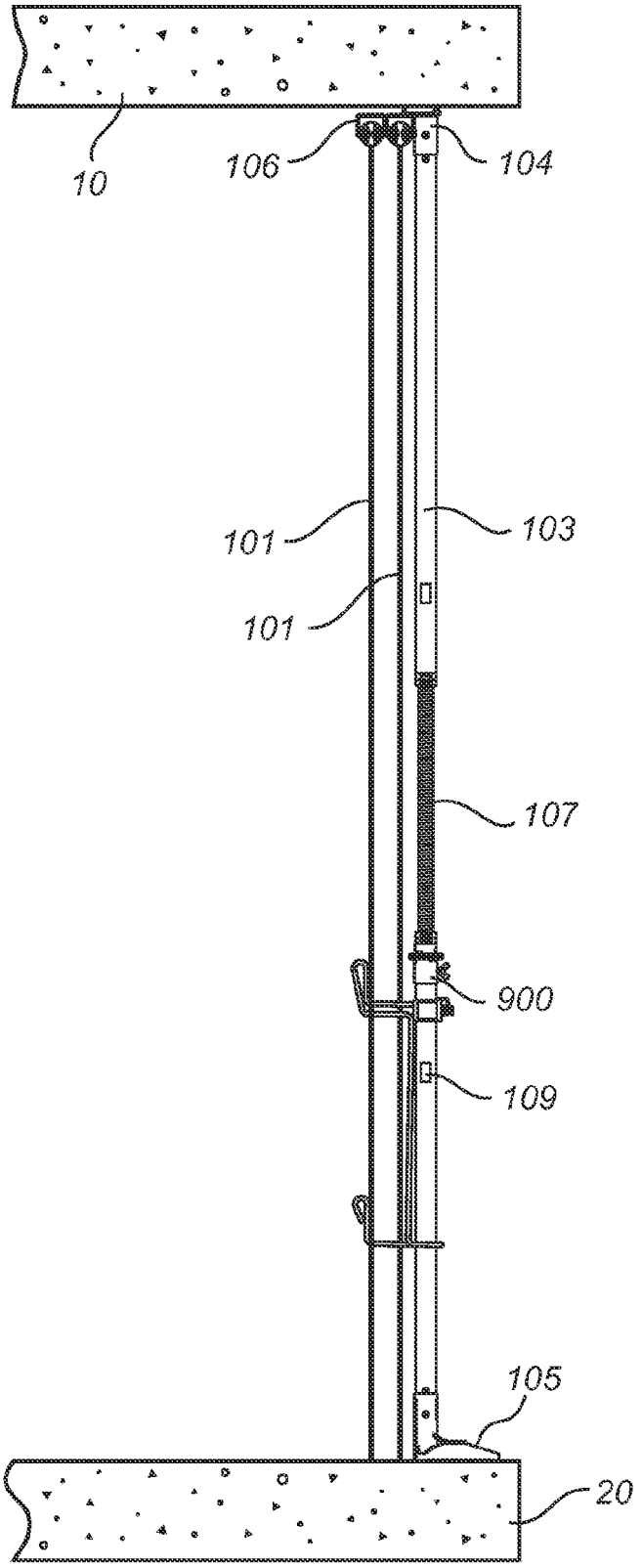

Fig. 2

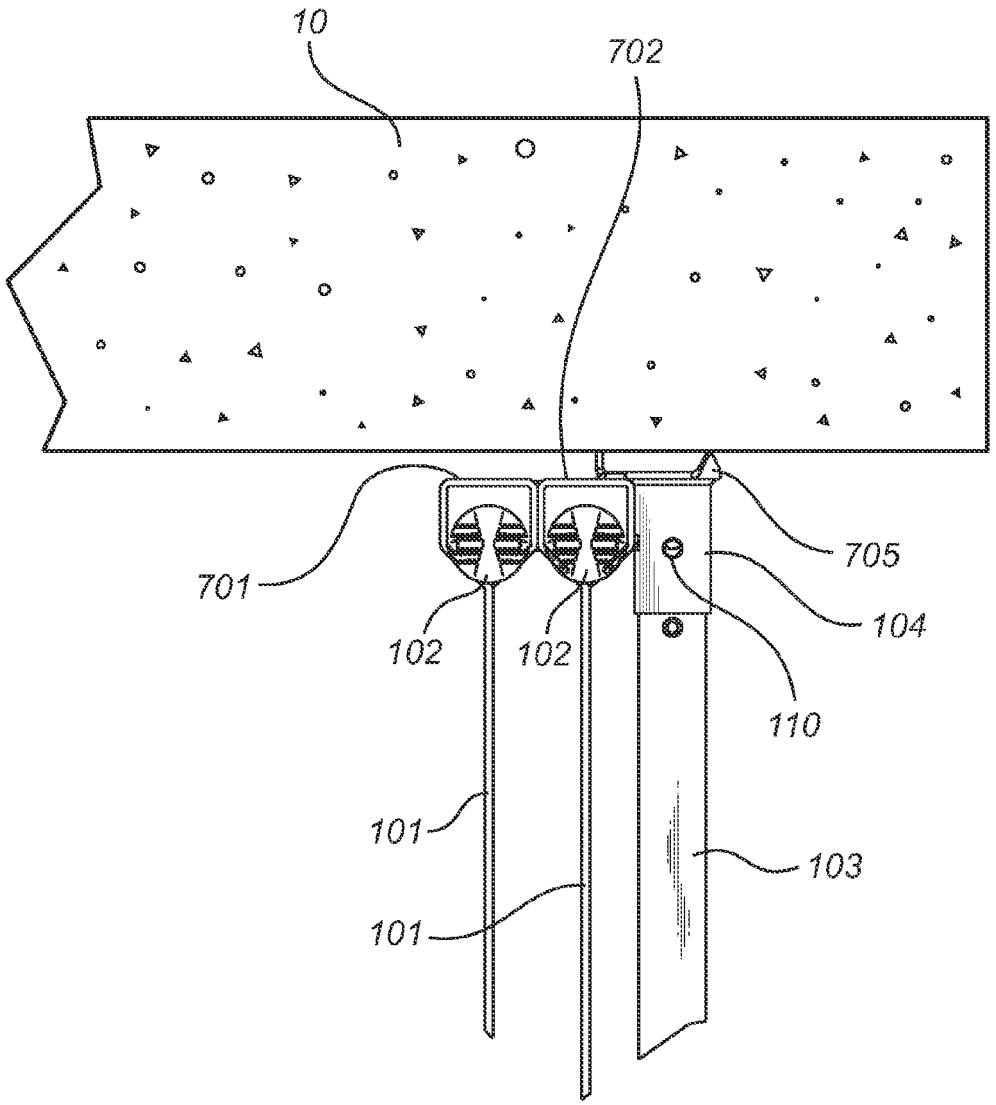

Fig. 2a

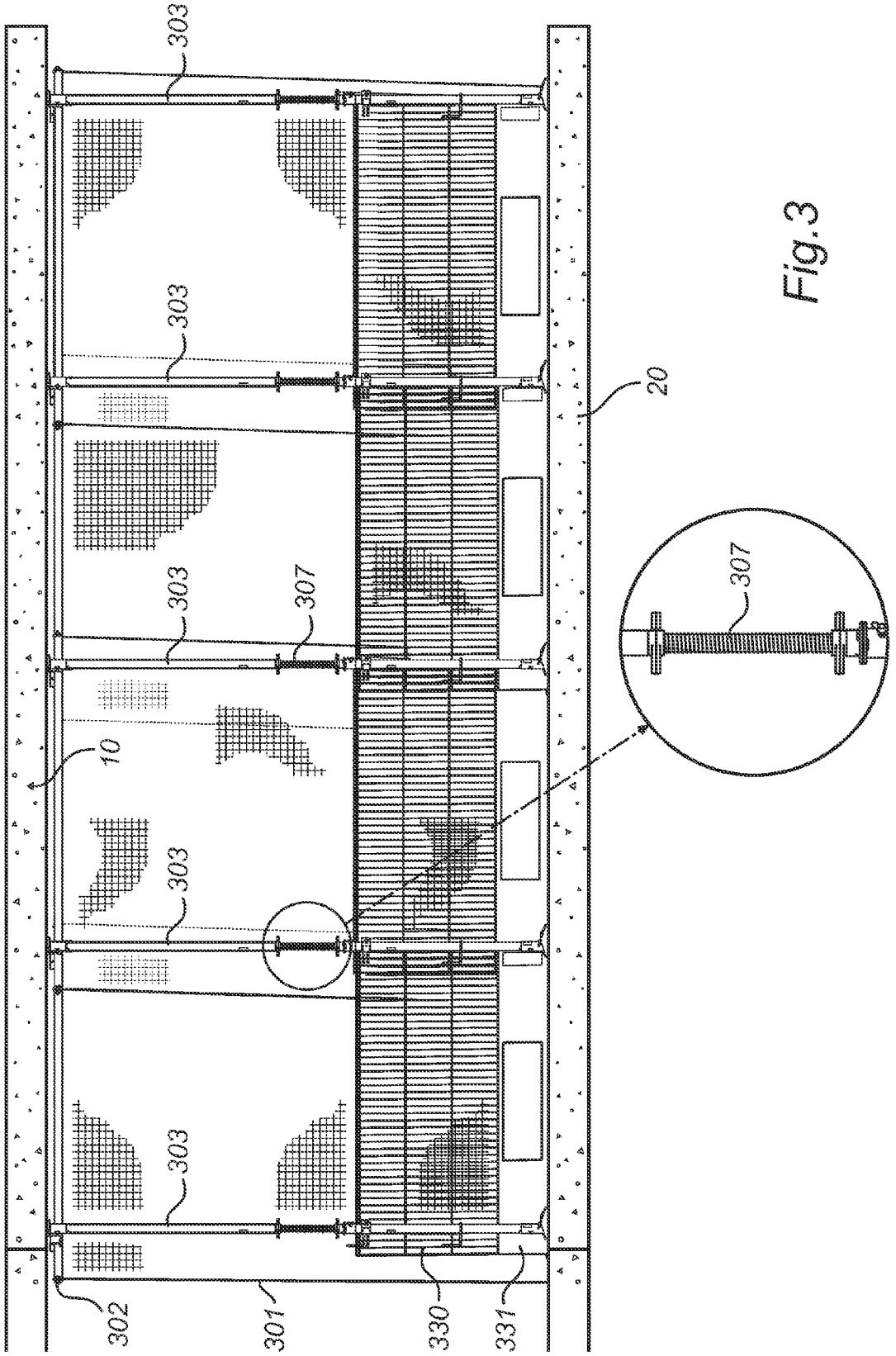

Fig.3

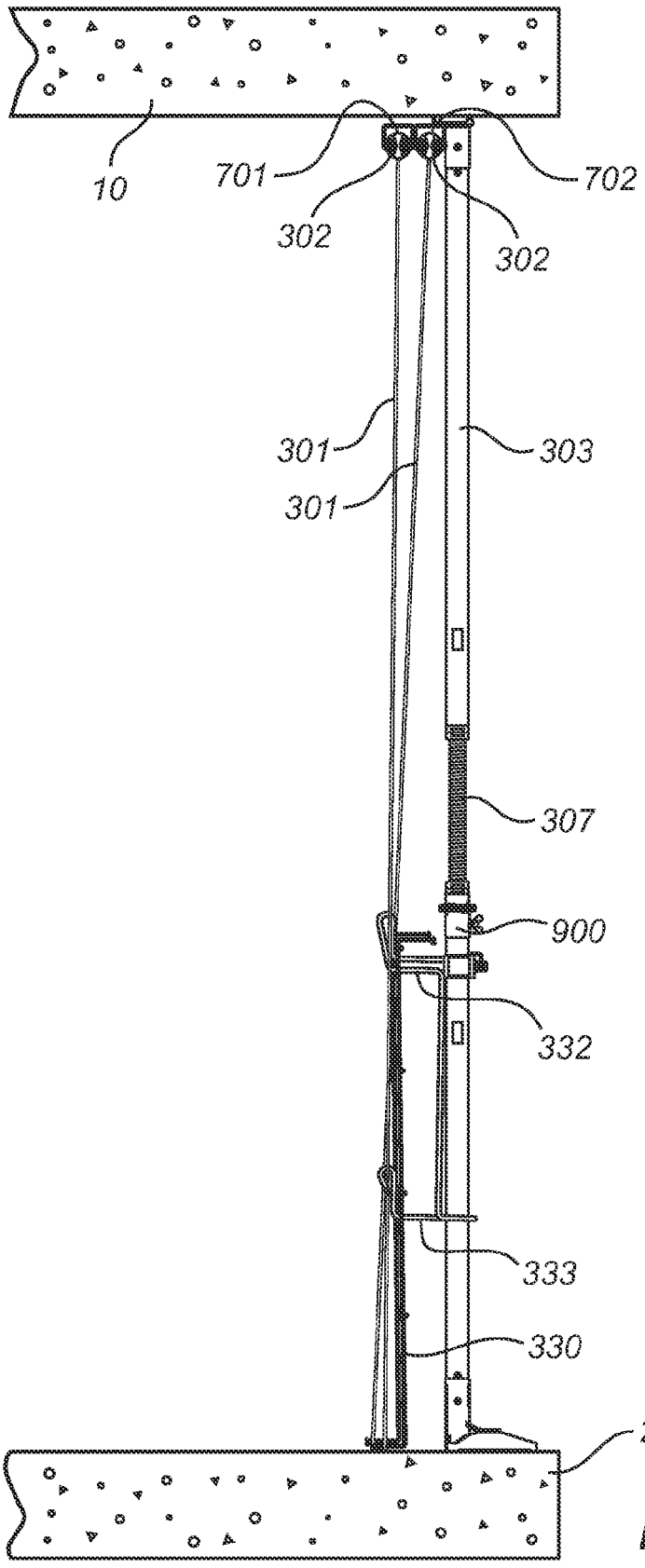

Fig. 4

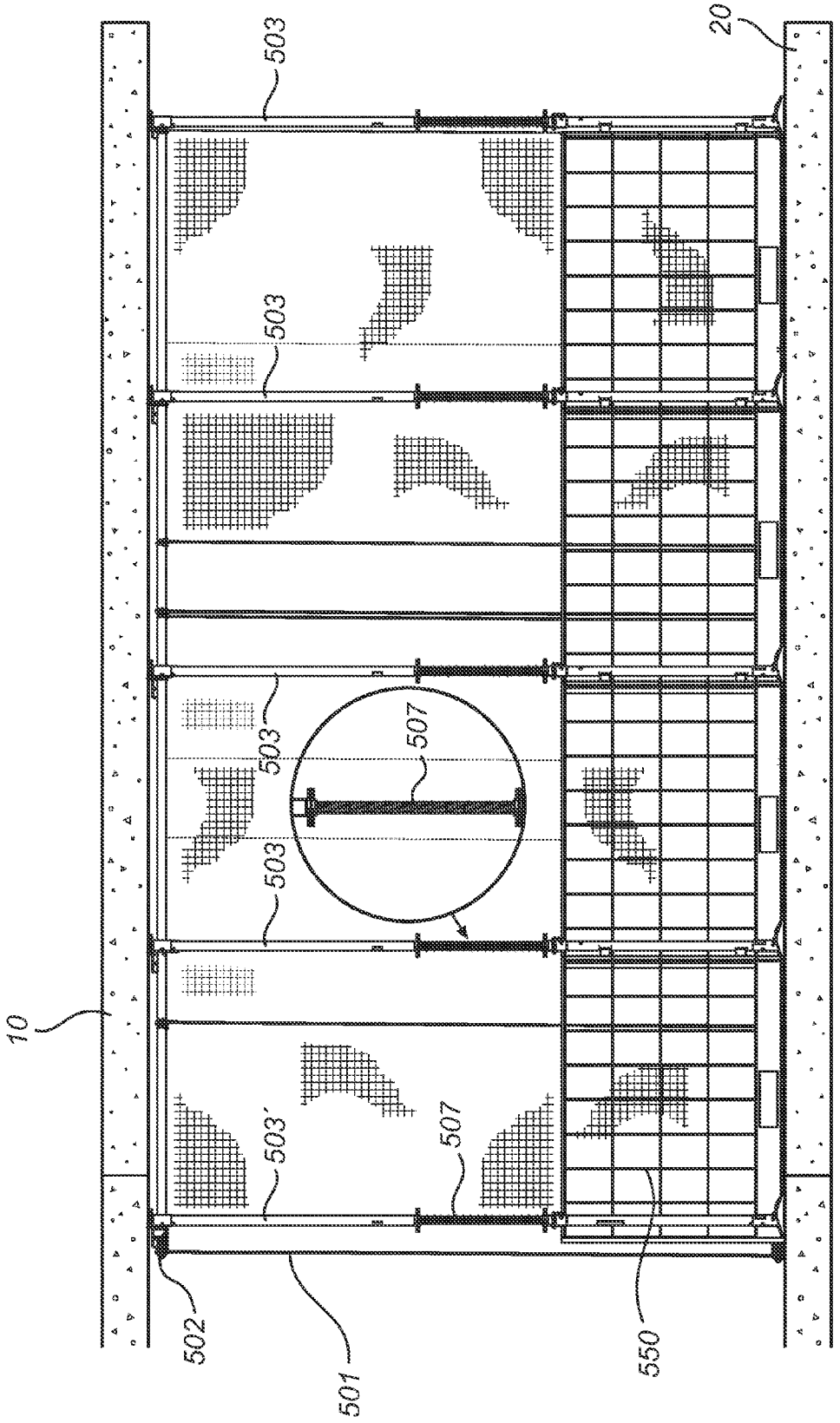

Fig. 5

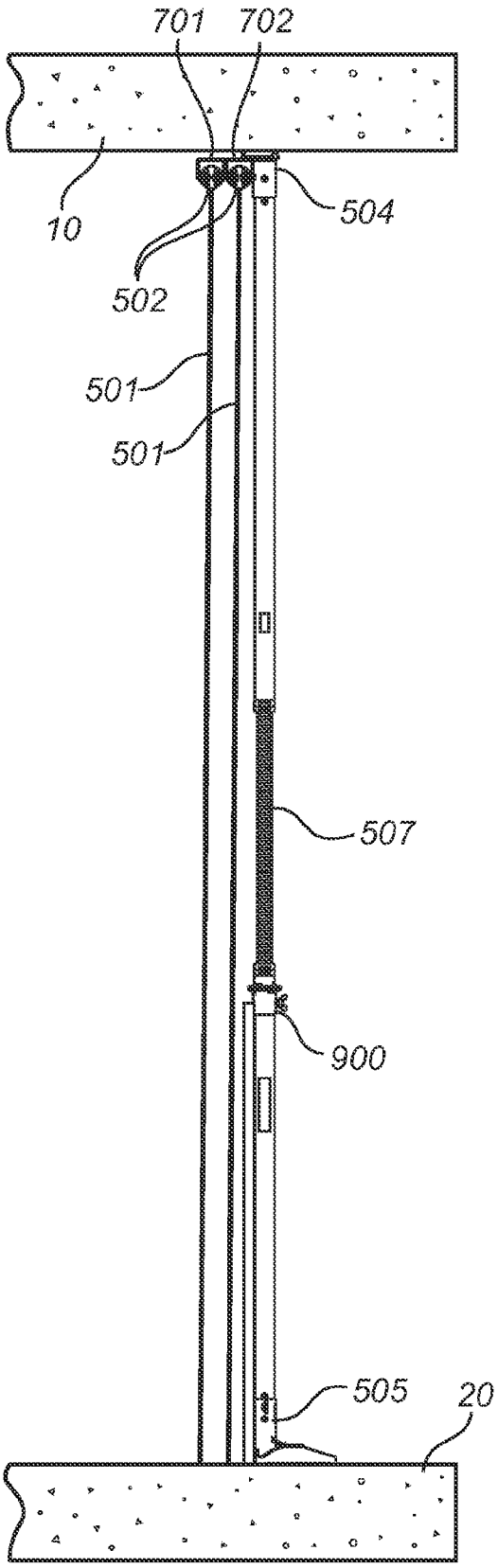

Fig. 6

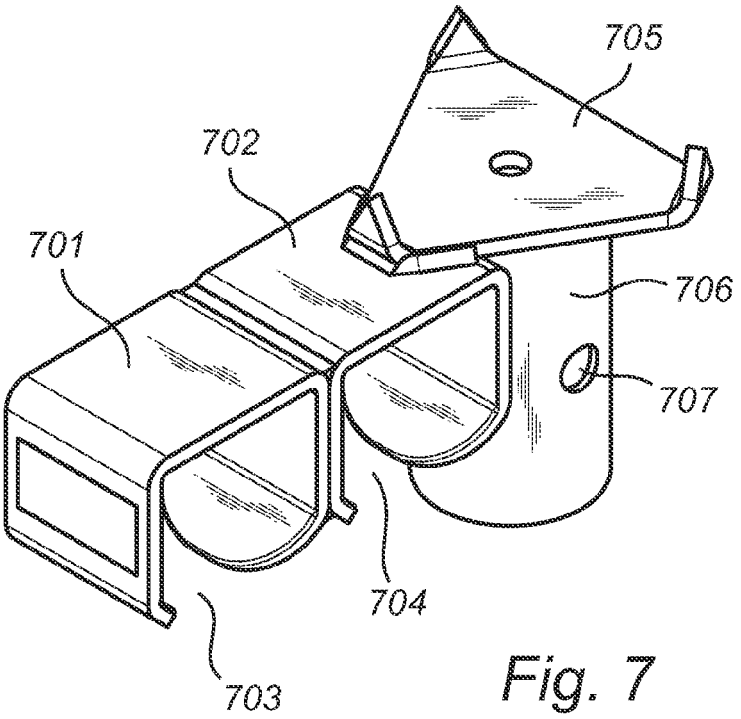

Fig. 7

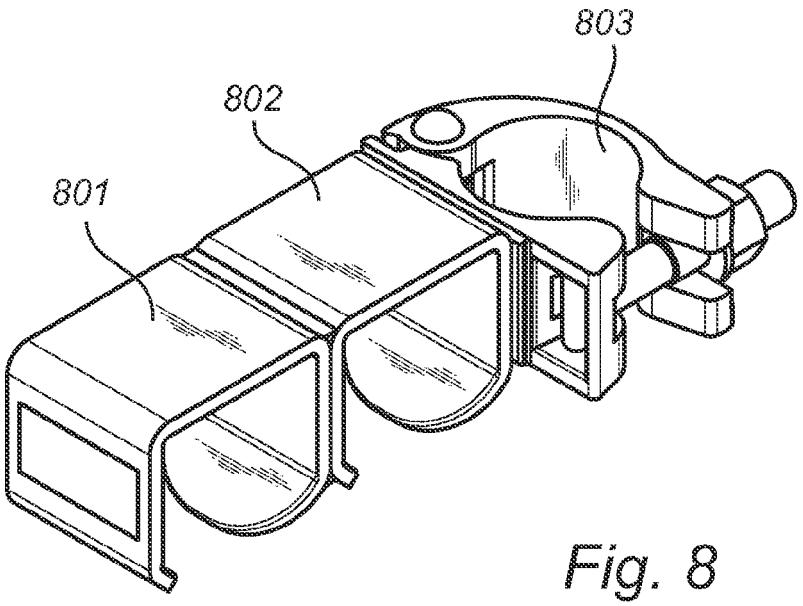

Fig. 8

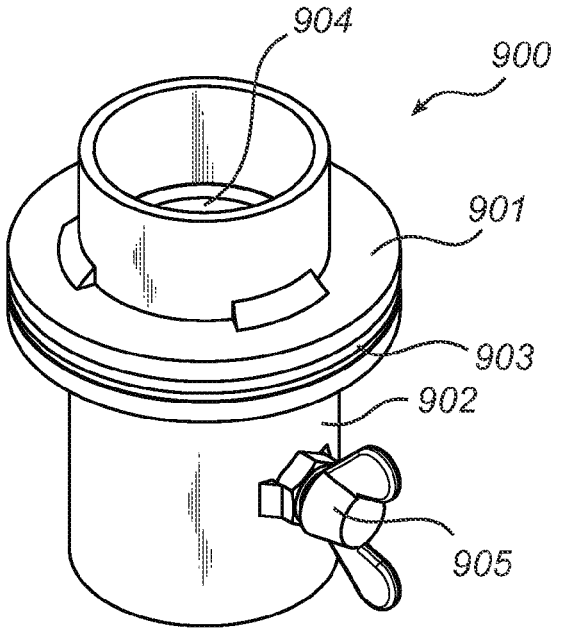

Fig. 9

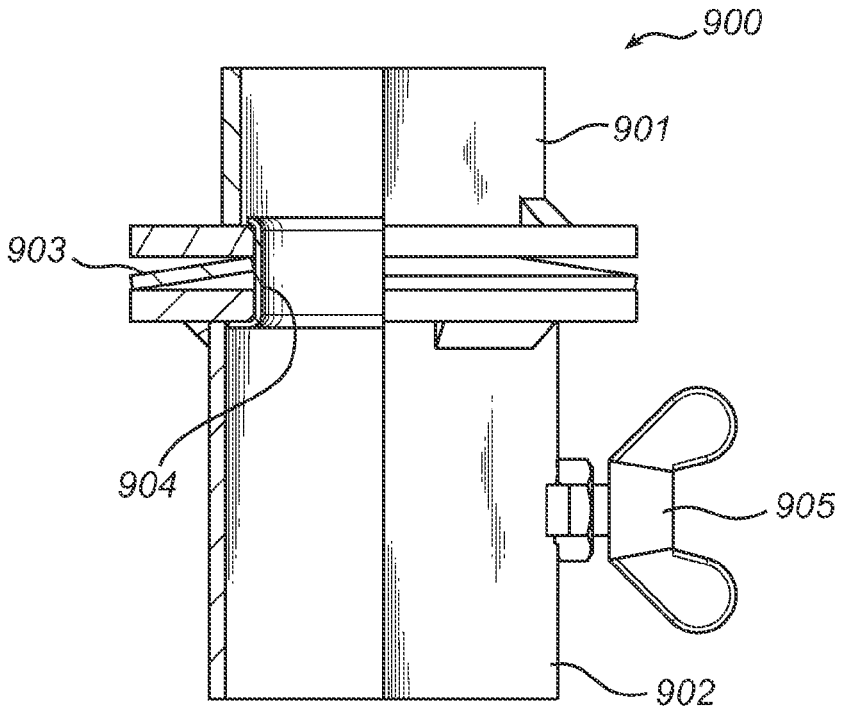

Fig. 10

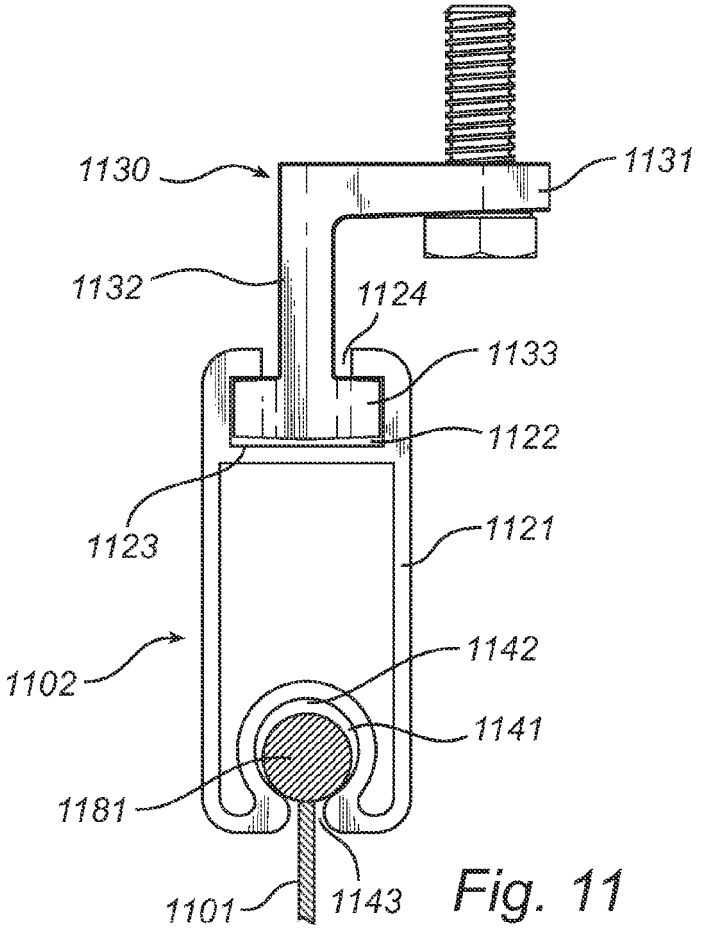
1130
1131
1132
1124
1133
1122
1123
1121
1102
1142
1141
1181
1101
1143

Fig. 11

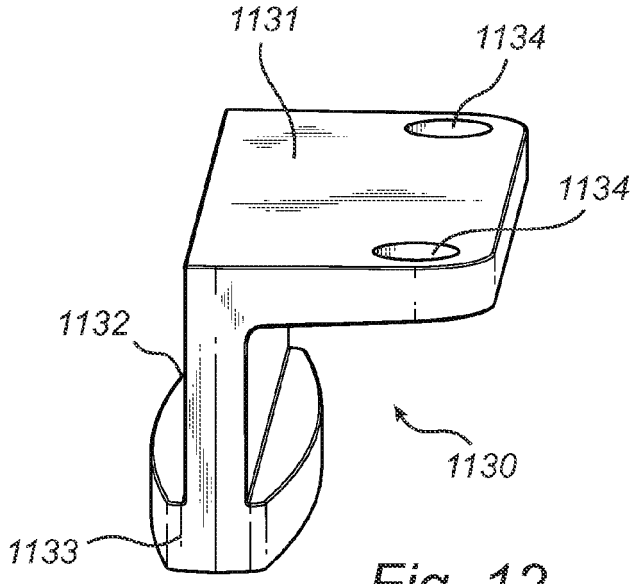
1131
1134
1134
1132
1130
1133

Fig. 12

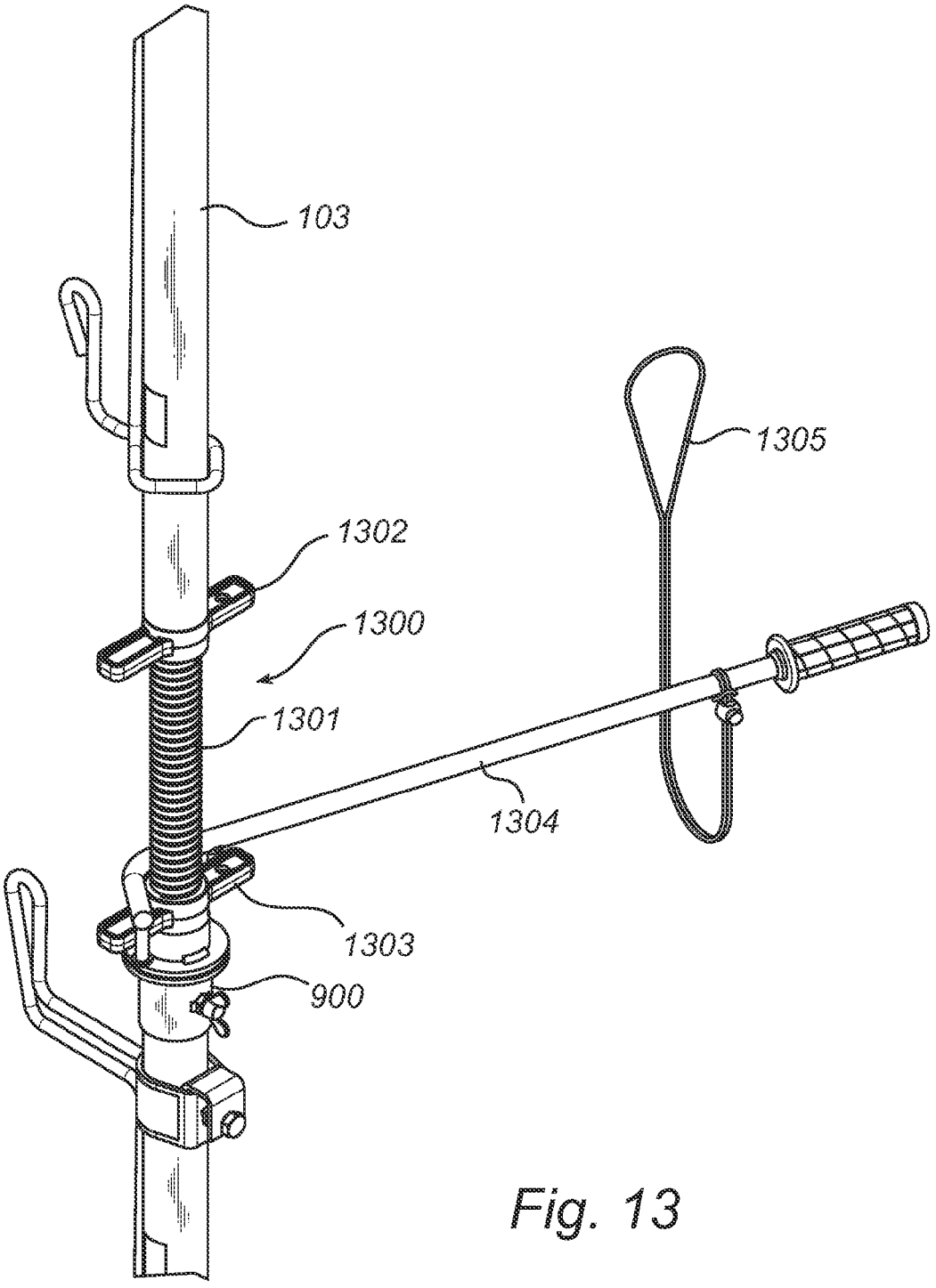

Fig. 13

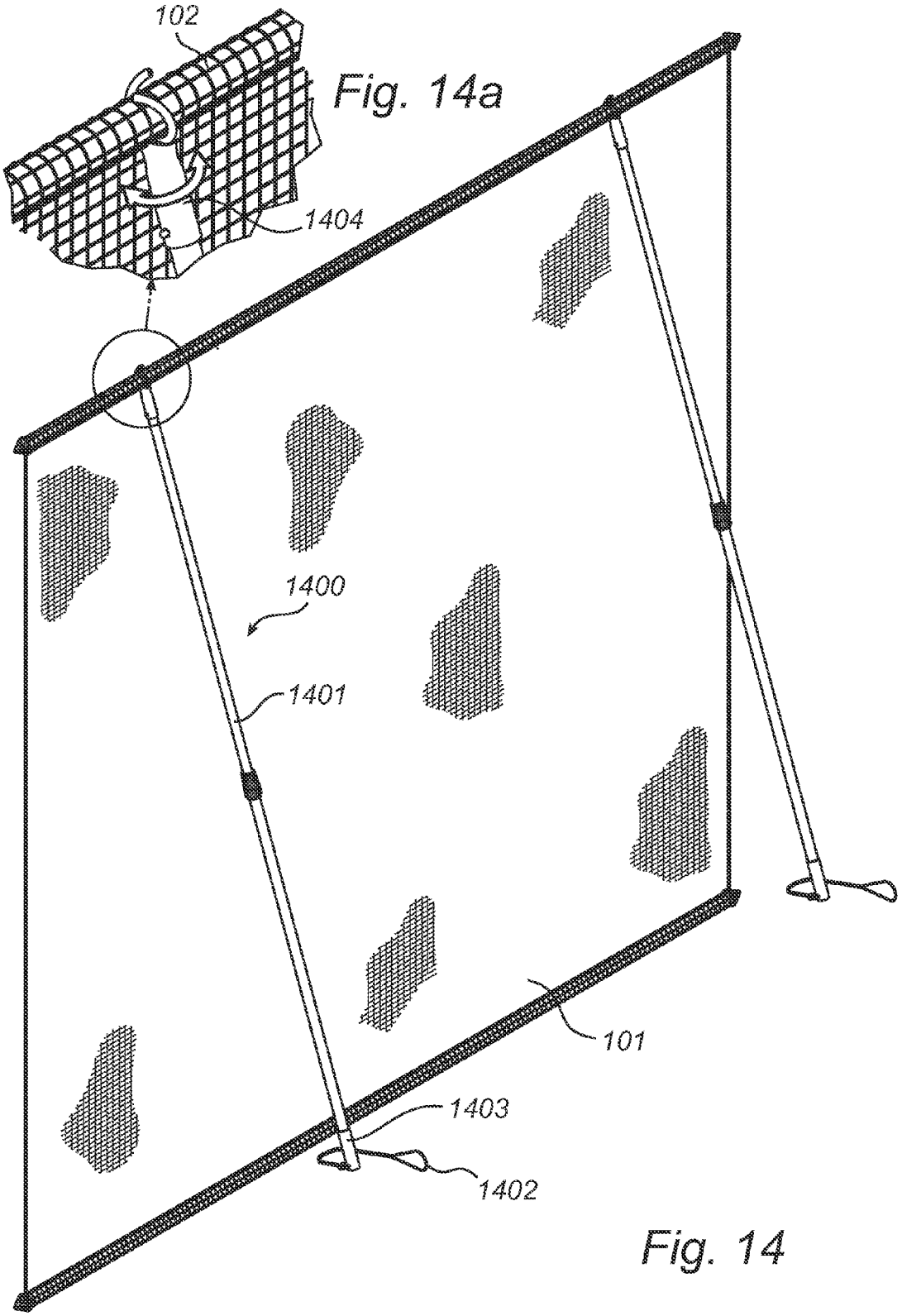

Fig. 14a

Fig. 14

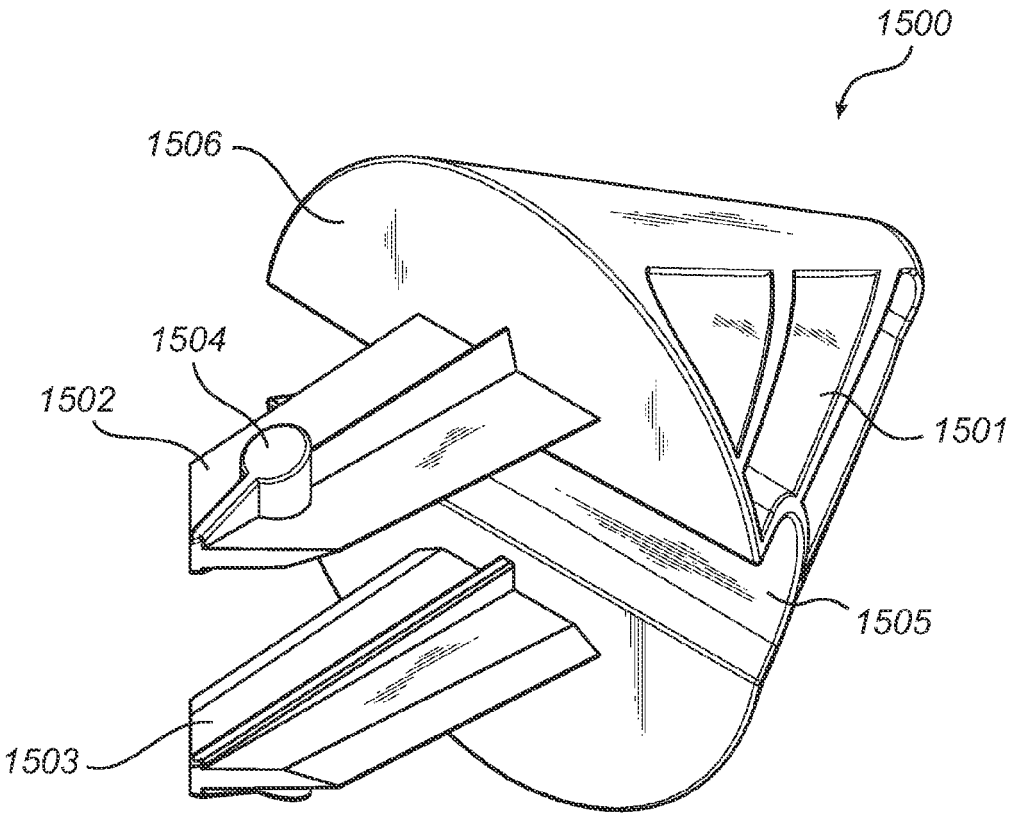

Fig. 15

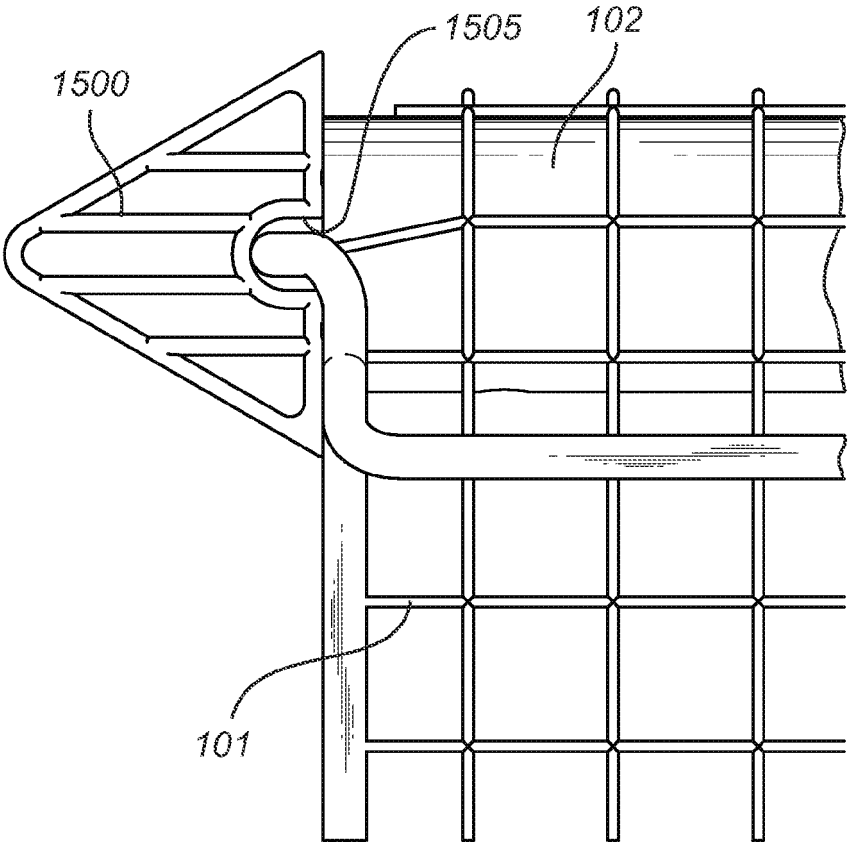

Fig. 16

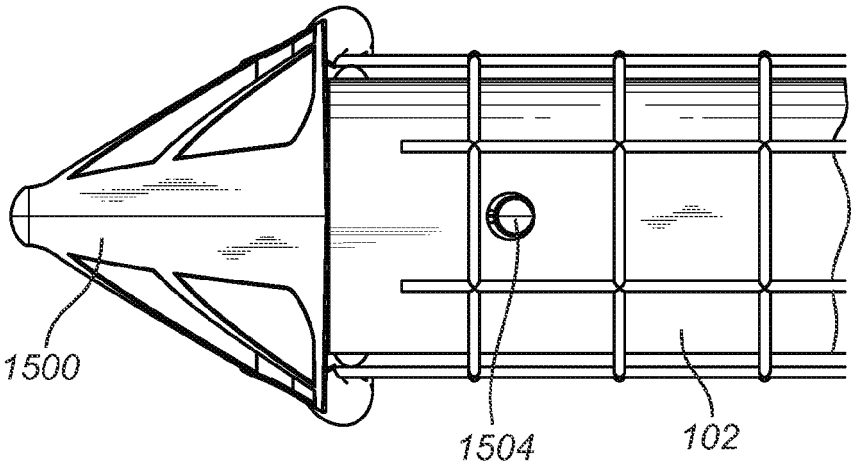

Fig. 17

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 10 16 0110

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 3 920 220 A (ELIAS MURRAY A) 18 November 1975 (1975-11-18) * figures 1,2 * -----	1-15	INV. E04G21/32 E04G21/24
Y	FR 2 442 320 A1 (BEAUDEUX & FILS BEAUDEUX & FILS [FR]) 20 June 1980 (1980-06-20) * figure 1 * -----	1-15	

TECHNICAL FIELDS SEARCHED (IPC)

E04G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	24 August 2010	Andlauer, Dominique

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

1

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 10 16 0110

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

24-08-2010

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3920220 A	18-11-1975	NONE	
FR 2442320 A1	20-06-1980	BE 881760 A1	16-06-1980

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

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 6904720 B **[0002]**